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Turkey

Turkey's strategic location makes it a natural "energy bridge" between major oil producing areas in the Middle East and Caspian Sea regions on the one hand, and consumer markets in Europe on the other. Turkey's port of Ceyhan is an important outlet both for current Iraqi oil exports as well as for potential future Caspian oil exports. Turkey's Bosporus Straits are a major shipping "choke point" between the Black and Mediterranean Seas. Finally, Turkey is a rapidly growing energy consumer in its own right.

Note: Information contained in this report is the best available as of July 2002 and can change.

RECENT DEVELOPMENTS

Turkey is currently attempting to recover from a severe economic contraction. After years of steady economic growth (3.7% annually between 1991 and 2000, with a decline in 1999 due to two severe earthquakes), Turkey's economic situation deteriorated sharply in February 2001 as a devastating financial crisis forced the country to sharply devalue its currency, the lira. In addition, Turkey's inflation and unemployment soared, and real gross domestic product (GDP) fell sharply (down 7.3% in 2001). Turkey's crisis was triggered in part by underlying structural weaknesses (i.e., current account deficits, serious problems in the country's banking sector, political instability). The September 2001 terrorist attacks on the United States further exacerbated Turkey's problems, with the International Monetary Fund (IMF) pointing in particular to "lower export demand, loss of tourism receipts, reduced access to international financial markets, and weaker privatization and foreign direct investment prospects."

In response to Turkey's economic problems, the IMF has announced a series of "stand-by credits." An IMF assistance package begun in December 1999 ultimately disbursed around $15 billion to Turkey. This was followed by a further, $17 billion assistance package, approved by the IMF on February 4, 2002 (as of June 28, 2002, Turkey had drawn about $11 billion of this total). IMF assistance to Turkey is conditioned on implementation of a variety of reform measures aimed at addressing the root causes of the country's economic problems. Among other things, Turkey has pledged to cut state spending and subsidies, reform the country's banking sector, privatize state-owned industries, lower the inflation rate, reduce the country's heavy debt burden, and in general create "a stable macroeconomic environment

conducive to economic growth." On July 18, 2002, the IMF stated that Turkey's economic stabilization and reform program was "broadly on track," although this appears optimistic given the country's difficulties meeting its fiscal targets. For 2002, Turkey's real GDP is expected to grow by about 2.6%, with an inflation rate of 41%.

Even prior to its recent economic crisis, Turkey faced numerous economic challenges, including: a large "underground" economy (estimated at 30%-100% of the reported economy); sharp income inequalities (between urban and rural areas in particular); low levels of private investment (Turkey hopes to increase this dramatically); a large, inefficient state sector; overly complicated legal and administrative procedures; a lack of foreign investment; and a failure to generate sufficient jobs for the country's rapidly growing population. Turkey also faces political instability, including a contentious coalition government and intense disagreement over key economic reforms required by the IMF. In addition, Turkey's desire to join the European Union (EU) has increased political debate over such issues as rights for ethnic Kurds, the death penalty and human rights, emergency rule in four eastern provinces, and democracy in general. On July 16, 2002, Turkey's governing coalition (led by Prime Minister Bulent Ecevit's Democratic Left Party -- DSP) effectively lost its majority in Parliament, with new elections being set for early November 2002.

ENERGY

Despite growth in Turkey's private sector in recent years, developments in the country's energy industry are still heavily influenced by the central government. The main energy decision-making body is the Ministry of Energy and Natural Resources (ETKB), currently headed by Zeki Cakan. Cakan replaced Cumhur Ersumer after Ersumer resigned in April 2001 due to the "white energy" corruption scandal over awards for power plant projects as well as for parts of the giant "Blue Stream" gas pipeline project (see below for more details on "Blue Stream"). In July 2002, three high-ranking former Turkish energy officials were found guilty of rigging state power contracts and taking bribes as part of this scandal. The three men were sentenced to

prison.

Prior to Turkey's recent severe economic difficulties, the country's energy consumption had been growing much faster than its production, making Turkey a rapidly growing energy importer. Assuming that the Turkish economy and energy demand return to a rapid growth path, Turkey will require billions of dollars worth of investments in coming years. On April 5, 2001, Turkey announced that it had ratified the Energy Charter Treaty, the international legal framework for energy investment. Also, in early 2001, the Turkish parliament passed an energy liberalization law aimed at ending the government's monopoly in the energy sector, and also geared towards attracting foreign energy investment. In late 2001, Turkey established the Energy Market Board and named Yusuf Gunay as its first energy regulator.

OIL

In general, Turkish oil consumption has increased in recent years, although the country's recent economic recession plus price deregulation measures (which have raised the price of many oil products) since June 1999 appear to have interrupted this trend for the time being. During the first four months of 2002, for instance, it appears that Turkish oil consumption and imports were down approximately 60,000 barrels per day (bbl/d) from the same period in 2000. In the long-run, Turkish oil demand and imports are expected to resume steady growth. Oil provides around 42% of Turkey's total energy requirements, but its share is declining (as the share of natural gas rises). Around 90% of Turkey's oil supplies are imported, mainly from the Middle East (Saudi Arabia, Iran, Iraq, Syria) and Russia. Turkey's port of Ceyhan is a major outlet for Iraqi oil exports, with pipeline capacity from Iraq about 1.2 million bbl/d.

Turkey's oil production is accounted for primarily by three companies -- the Turkish State Petroleum Company (TPAO), and foreign operators Royal Dutch/Shell (Shell) and ExxonMobil. Smaller companies include Petrom of Romania (produces around 2,600 bbl/d in the Selmo block) and Aladdin Middle East (480 bbl/d in Siirt and Gaziantep). TPAO alone accounts for

about 80% of the country's total oil output (currently around 56,000 bbl/d, down from 90,000 bbl/d in 1991). Turkish oil fields are generally small, and scattered around the country. Oil fields in the country's southeast (specifically the Hakkari Basin, Turkey's main oil producing area) are generally old and expensive to exploit. In addition to the Hakkari Basin, Turkey contains oil prospects in its European provinces, in the Black Sea shelf region, and in other oil basins in southern and southeastern Turkey. Potential oil reserves in the Aegean Sea have not been explored due to conflicting Greek claims over the area.

In September 1994, TPAO became part of the Azerbaijan International Operating Company (AIOC), a consortium of foreign oil companies in a multi-billion dollar oil production-sharing agreement with Azeri state oil company SOCAR to develop three offshore oil fields in the Caspian Sea region. TPAO holds a 6.75% share in AIOC. TPAO has established an oil exploration company in Kazakhstan (Kazakhturkmunay) as well, and also is active in other areas of the world, including the Middle East and North Africa.

For several years, it has been reported that as much as 100,000 bbl/d of oil and oil products were being smuggled into Turkey via tanker truck, mainly from northern Iraq. This "border trade" costs the Turkish treasury millions of dollars in lost tax revenue. In March 2000, Turkey's National Security Council (MGK), concerned at lost tax revenues as well as harm to state companies Petrol Ofisis (Poas, the country's largest fuel retailer) and Tupras (which controls 85% of Turkey's refining capacity), imposed controls on petroleum product smuggling from Kurdish areas of northern Iraq, Iran, Georgia, the Azeri enclave of Nakhchevan, Syria, and Bulgaria. A previous crackdown on smuggling in May 1999 reportedly had little effect. On September 18, 2001, Turkey reportedly stopped the diesel oil trade at the Habur border gate with Iraq, but allowed it to restart on January 7, 2002.

In May 2002, a major petroleum market reform bill was sent to Turkey's parliament. If enacted, the law will liberalize pricing of oil and oil products as well as integrate pipeline, refining, and distribution functions. Tupras and

Poas are to be privatized as well.

Pipelines

Oil and gas transportation is a crucial and contentious issue in the Caspian Sea/Central Asia regions. Turkey and the United States have pushed for a "Western route" pipeline that will carry oil from Azerbaijan's port of Baku through Azerbaijan and Georgia and then across Turkey to Ceyhan. The planned 1-million-bbl/d capacity, "Main Export Pipeline" will stretch approximately 1,038 miles (281 miles through Azerbaijan, 135 miles through Georgia, and 622 miles through Turkey) and is expected to cost $2.8-$2.9 billion to construct. Despite initial opposition to the pipeline, which several oil companies criticized as too costly and uneconomical with the planned volumes from Azerbaijan, construction on the Turkish section of the pipeline began in June 2002. The entire pipeline is expected to be finished in late 2004, with the first tanker leaving Ceyhan with Azeri oil in January 2005.

Russia, on the other hand, has promoted a "Northern route" across the Caucasus to the Russian Black Sea port of Novorossiisk. In March 2001, the Caspian Pipeline Consortium (CPC) commissioned the 990-mile, $2.5 billion, 1.34 million-bbl/d-capacity pipeline. From there, oil is transported through the Bosporus Straits. Preliminary plans are to increase exports via the CPC pipeline to 520,000 bbl/d in 2003, but the pipeline is not scheduled to reach its full capacity until about 2015. Turkey has raised concerns about the ability of the Bosporus Straits to handle additional tanker traffic that will be necessary to handle the planned volume of Kazakh oil to be exported via the CPC pipeline. Turkey has expressed its concern that the Straits, already a major chokepoint for oil tankers, cannot handle the strain of additional traffic, raising environmental concerns about a collision leading to an oil spill in the Straits. Although Kazakhstan has argued against limiting oil tanker traffic through the Straits, a number of "Bosporus bypass" options are under consideration or being developed in southeastern Europe. In addition, Ukraine already has constructed a new pipeline, the Odessa-Brody pipeline, specifically to transport oil from the Caspian Sea region to European markets.

One advantage which Baku-Ceyhan has over other potential options for Caspian oil transport is that Ceyhan can handle Very Large Crude Carriers (VLCCs), while the ports of Supsa (Georgia) and Novorossiisk (Russia) are restricted to smaller LR-2 tankers which can transit the Bosporus. Another advantage for Ceyhan is that it can remain open all year, compared to Novorossiisk, which is closed up to two months per year due to bad weather. After failing to come to agreement with other energy companies to join the sponsor group, in March 2002 the Azerbaijan State Oil Company (SOCAR) reduced its stake in the pipeline project to 25%, distributing 20% among other group members. In June 2002, SOCAR sold an additional 5% share to TotalFinaElf (France-Belgium), but rejected a proposal from ChevronTexaco to join the sponsor group. At the end of June 2002, the head of the sponsorship group, Michael Townshend of BP, said that the pipeline ownership group was complete. Shares in MEPCO are as follows: BP (38.21%), SOCAR (20%), Unocal (9.58%), Statoil (8.9%), TPAO (7.55%), TotalFinaElf (5%), ENI (5%), Itochu (3.4%), and Saudi Delta Hess (2.36%).

Refining/Downstream

Turkey has refining capacity of 719,275 bbl/d at 6 refineries. Refining and other downstream operations in Turkey are dominated by partly-state-owned company Tupras, which has four main refining complexes: Batman in the southeast, Aliaga near Izmir, Izmit near Istanbul (the country's largest refinery, damaged during the August 1999 earthquake), and the Central Anatolian Refinery at Kirikkale near Ankara. In 2002, Tupras' share of the Turkish fuels and lubricants market was around 78%, with other major retailers including BP, ExxonMobil, TotalFinaElf, Agip, and ConocoPhillips. Tupras is planning a fifth refinery -- a $700-$800 million facility near Yarimca in western Turkey -- to be completed by 2007. Tupras has a modernization program designed to switch output at its refineries towards lighter products. Turkey's sole private refinery is ATAS, near Mersin on the Mediterranean coast, a joint venture of Mobil (51%), Shell (27%), BP Amoco (17%), and local company Marmara Petrol ve Rafineri Isleri AS (5%).

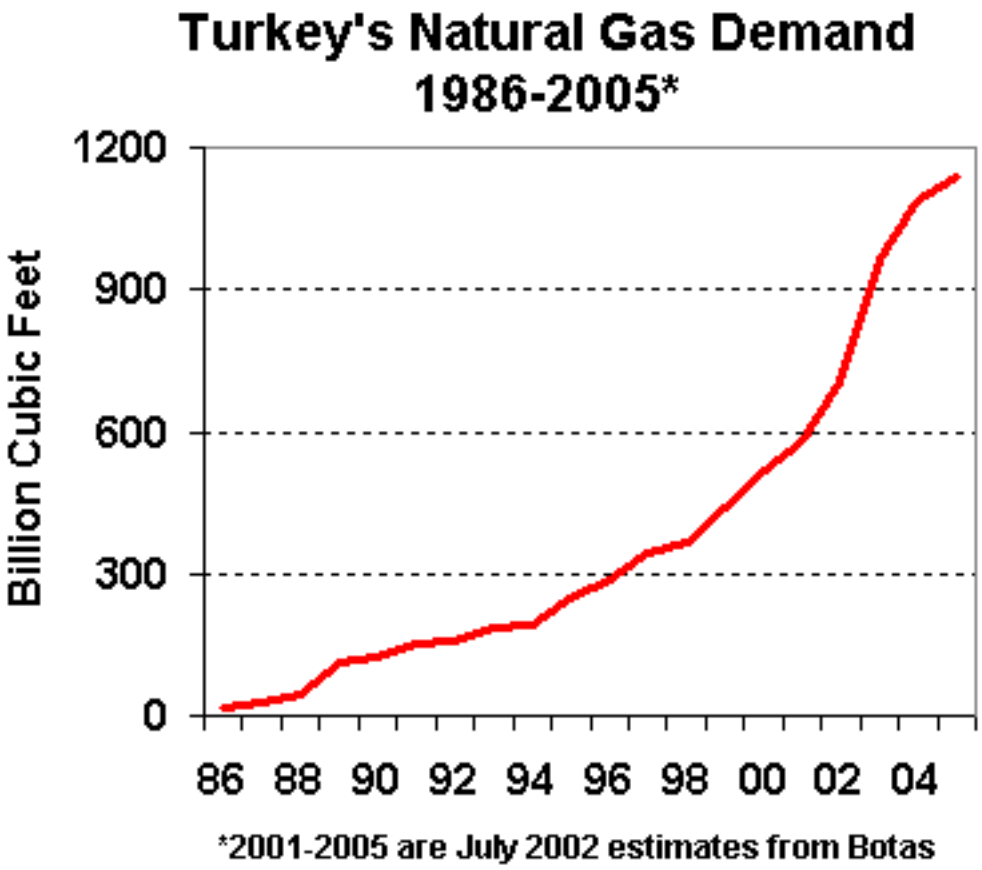
In July 2002, Turkey's government announced that it would sell its 25.8%

share in Poas to the majority shareholder, Is Dogan Petrol Yatirimlari AS. The announcement came amidst calls by the IMF for an acceleration in Turkey's privatization process. In a related development, Turkey's privatization agency stated in early July 2002 that the government hoped to privatize most of the country's energy sector during 2003.

NATURAL GAS

Consumption and Production

Turkey consumed 520 billion cubic feet (Bcf) of natural gas (nearly all imported) in 2000, accounting for around 17% of Turkey's total energy consumption (Turkish gas consumption in 2002 is estimated at around 700 Bcf). Prior to Turkey's recent severe economic problems (plus price deregulation moves), Turkish natural gas demand had been projected to increase extremely rapidly in coming years, with the prime consumers expected to be natural-gas-fired electric power plants and industrial users. Now, however, state natural gas and pipeline company Botas has revised its natural gas demand growth projections down sharply based on Turkey's economic problems. For instance, Turkish natural gas demand had been forecast at about 1.6 trillion cubic feet (Tcf) in 2005, but now is expected to reach only 1.1 Tcf in that year, a 37% downward revision. Many analysts now believe that, given lower Turkish natural gas consumption forecasts, only one of the main import options under development (i.e., Blue Stream, Trans-Caspian Pipeline - TCP, Shah Deniz) -- can be supported for some time.



This sharp downward revision in Turkey's projected natural gas demand could have significant repercussions, since Turkey already has signed contracts for far more natural gas than it is expected to need. To date, Turkey has signed deals for around 2 Tcf per year of natural gas imports beginning in 2005, around three times greater than current Turkish gas consumption. Of this total, over 20% is already coming from Russia via Bulgaria (studies on expanding the Russia-Bulgaria-Turkey "Main Line" are underway), 17% from Iran, and 9% from Algeria and Nigeria combined as liquefied natural gas (LNG). In the future, around one-fourth of Turkey's gas imports are to be supplied from Russia via the Black Sea (see "Blue Stream" below), another quarter from Turkmenistan (beginning in 2005), and about 10% from Azerbaijan (beginning in 2005). Under the "take-or-pay" provisions of natural gas supply contracts with countries like Iran and Russia, Turkey reportedly could be forced to pay cash penalties of up to $1 billion per year if it fails to purchase contracted gas. Already, the National Iranian Gas Company (NIGC) has stated that, if Turkey fails to take the volume of natural gas agreed to for 2002, NIGC will invoke a penalty clause under "take or pay" provisions.

Natural gas is Turkey's preferred fuel for new power plant capacity for several reasons: environmental (gas is less polluting than coal, lignite, or oil); geographic (Turkey is close to huge amounts of gas in the Middle East and Central Asia); economic (Turkey could offset part of its energy import bill

through transit fees it could charge for oil and gas shipments across its territory); and political (Turkey is seeking to strengthen relations with Caspian and Central Asian countries, several of which are potentially large gas exporters). The United States, among others, has been encouraging Turkey to utilize its unique geographical position to become a major transit center for natural gas from the Caspian/Central Asia to Europe. At the same time, however, Turkey's reliance on Russia for gas imports could reach 70% or higher, seemingly undercutting Turkey's goal of diversifying its fuel suppliers.

Turkish natural gas production in 2000 (23 billion cubic feet -- Bcf) met around 4% of domestic natural gas consumption requirements. Major natural gas producers in Turkey include Arco, TPAO and Shell. Marmara Kuzey (North Marmara), which came onstream in May 1997, is the country's largest non-associated gas field. Marmara Kuzey is located offshore in the Thrace-Gallipoli Basin of the Sea of Marmara. In March 2002, the Gocerler natural gas field was officially opened, 16 months after its discovery in the Thrace basin. Production potential is estimated to be as high as 100 Bcf per year. Also, in July 2001, TPAO announced that it had found gas in the Mersin and Iskenderun bays in Turkish areas of the Mediterranean. Currently, most Turkish associated gas is reinjected into oilfields as part of an Enhanced Oil Recovery (EOR) system.

"Blue Stream" Pipeline

On December 15, 1997, Russia and Turkey signed a 25-year deal under which the Russian gas company, Gazprom, would construct a new natural gas export pipeline (called "Blue Stream") to Turkey for delivery capacity of around 565 Bcf annually, with initial deliveries possibly starting in 2002. The $3 billion, 758-mile dual pipeline is slated to run from Izobilnoye in southern Russia, to Dzhugba on the Black Sea, then under the Black Sea for about 247 miles to the Turkish port of Samsun, and on to Ankara.

In March 2002, the first line of "Blue Stream" was completed, with work on the deep-sea portion of the second line begun in June. Construction of the

Turkish onshore section of the pipeline is already complete, while the 222-mile Russian section of the pipeline, which includes compressor stations and underground storage facilities, is scheduled to be finished by September 2002.

Natural gas supplies through the Blue Stream pipeline are slated to begin in October 2002, with Russia scheduled to deliver 70.6 Bcf of natural gas to Turkey via the pipeline this year. By 2009, Blue Stream is expected to reach peak capacity of 565 Bcf per year. Over the course of the 25-year agreement, Turkey will import 14.1 Tcf of natural gas from Russia via Blue Stream. Eventually, the Blue Stream project could be extended onwards to other Mediterranean countries, including Greece.

Other Natural Gas Import Deals

In late January 2002, Iran and Turkey officially inaugurated a much-delayed natural gas pipeline link between the two countries. This follows several years of delays due to economic, political, and technical factors. In 1996, Iran and Turkey had signed a $20 billion agreement that called for Iran to supply Turkey with more than 8 Tcf of natural gas over a period of 22 years beginning in late 1999. Officials in Turkey and Iran variously blamed U.S. sanctions, financing problems on the Turkish leg of the $1.9 billion pipeline, economic recession in Turkey, and delays by the Iranians in completing an important metering station for delaying the project. Exports of Iranian natural gas to Turkey are expected at about 105 Bcf in 2002, rising to 350 Bcf per year by 2007. There are questions, however, whether Turkish demand will grow rapidly enough to absorb this volume of natural gas from Iran, in addition to gas slated to be supplied by Russia, Algeria, and Nigeria.

If Turkish demand does not support the level of natural gas imports for which it has contracted (from Iran and others), Turkey could become an important transit center for natural gas exports to Greece and beyond. Along these lines, Greece and Turkey signed an agreement on March 28, 2002 which calls for extending the natural gas pipeline from Iran to Turkey into Greece. Reportedly, the 177-mile-long pipeline would connect Ankara to Alexandroupolis in northern Greece and would cost $300 million. After that,

natural gas could be transported to Europe via Bulgaria or via an undersea pipeline to Italy, where gas demand -- especially for electric power generation -- is expected to grow rapidly in coming years. A deep water option could be extremely expensive, however, making an overland route more likely.

On May 21, 1999, state natural gas and pipeline company Botas signed an agreement on building a $2-$2.4 billion, 1,050-mile, gas pipeline from Turkmenistan, underneath the Caspian Sea, across Azerbaijan and Georgia (both of which would collect transit fees), and on to Turkey. Gas deliveries of 565-1,060 Bcf per year are possible, with additional gas possibly being sent onwards to Europe. The consortium is led by US company Bechtel and including General Electric, Shell, and PSG International. In mid-July 1999, a top Turkish energy official stated that the TCP from Turkmenistan was still the preferred option for Turkey despite the potentially huge (as high as 35 trillion cubic feet -- Tcf) Shah Deniz gas field in Azerbaijan, which is located hundreds of miles closer (and on the western side of the Caspian Sea) to Turkey than Turkmenistan. Currently, however, progress on the TCP appears stalled, with the international consortium essentially having suspended operations, while Blue Stream proceeds.

Despite previous Turkish government statements that a gas pipeline from Turkmenistan was a top priority, this now seems highly unlikely, as it would compete against the proposed Blue Stream project, as well as against possible gas supplies from Iran and, especially, Azerbaijan. After months of negotiation and delay, Azerbaijan and Turkey signed a long-term natural gas purchase and supply contract on March 12, 2001. Starting in 2005 (delayed one year from the original target date), Azerbaijan will deliver 70 Bcf of natural gas to Turkey in 2005, rising to 177 Bcf in 2007 and around 230 Bcf per year from 2008 through 2020. Natural gas for the deal will come mainly from Azerbaijan's Shah Deniz field, which is scheduled to come online in 2004. In order to deliver this natural gas, it will be necessary to construct a pipeline from Baku to Erzurum in eastern Turkey, where the natural gas will join the Turkish natural gas distribution system. Originally, Azeri officials had hoped to use the existing Soviet-era Gazi-Magomed-Gazakh pipeline, but

technical inspection of the pipeline, along with the planned export volumes, determined that a new pipeline will be necessary.

The Baku-Erzurum pipeline will stretch some 630 miles, including 290 miles in Azerbaijan and approximately 170 miles in both Georgia and Turkey. Currently, the pipeline project is estimated to cost $1 billion. Credits to be drawn from international financial institutions, including the World Bank, European Bank for Reconstruction and Development (EBRD), International Finance Corporation (IFC), and investors from the United States and Japan are expected to cover 70% of the pipeline's construction costs, while shareholders in the development of the Shah Deniz field development will contribute the remaining 30%.

In September 2001, Georgia and Azerbaijan cleared a major hurdle for implementation of the pipeline plan by signing a transit agreement. The Azeri parliament ratified the transit agreement in October 2001, followed by the Georgian parliament in December 2001. In January 2002, Georgia announced it would build two, 88.3-Bcf-capacity underground natural gas storage facilities in the east and southwest of the country as part of the pipeline project.

Construction of the Baku-Erzurum pipeline is scheduled to begin in late 2002, with the pipeline operational by the end of 2004. Initial capacity on the pipeline is slated to be 777 billion cubic feet (Bcf) per year, with capacity eventually rising to 1.06 Tcf per year. With natural gas production in the first stage of exploitation of the Shah Deniz field expected to be 282 Bcf per year, the Baku-Erzurum pipeline will have excess capacity to pipe additional Caspian Sea region natural gas exports, possibly from Turkmenistan if the Caspian littoral states agree on a legal regime for the Sea, allowing the proposed TCP to be built.

Natural gas also could transit Georgia via a proposed north-south pipeline from Russia to eastern Turkey, with one route also passing through Armenia. In November 2000, Georgia approved a project for a 37-mile pipeline to carry

Russian natural gas to Turkey via the Georgian Black Sea coast. After a September 2001 meeting, Georgian officials announced that representatives from Conoco and Turkey's Acsoy Group were ready to invest in the pipeline, which would transport 35.3 Bcf per year of natural gas from Kobuleti, Georgia, to Hopa, Turkey.

Georgia also has held discussions with Gazprom on refurbishing the existing North Caucasus-Transcaucasian natural gas pipeline and extending it into a trans-Georgian pipeline to bring Russian natural gas to Armenia and Turkey. However, this idea has lost some support as Russia focuses on delivering its gas to Turkey via the "Blue Stream" natural gas pipeline under the Black Sea.

Egypt, with huge gas reserves of its own, is another possible source of gas for Turkey, either by pipeline or via LNG tanker. This latter option would include construction of a $1.2-billion liquefaction terminal near Port Said on the Mediterranean coast, and a regasification facility at Izmir in Turkey. Egypt and Turkey signed a preliminary agreement for LNG exports in 1996, but analysts have raised serious questions about whether the project is economically feasible. Also, given the fact that Turkey already has committed to buying more gas than it probably needs for years to come, it is hard to see how Egyptian gas will fit into the picture. Still, new LNG terminals in Turkey are being planned, besides the sole existing, 140-Bcf capacity, terminal adjacent to the existing Marmara Ereglisi combined cycle gas turbine power station. Other possibilities include a regasification terminal at Aliaga (near Izmir on the Aegean Sea), an LNG terminal at Iskenderun on the Mediterranean, and even the world's first floating LNG terminal.

Other Natural Gas Issues

In 2001, Turkey passed legislation which will abolish Botas' monopoly, separating the company into units for natural gas import, transport, storage, and distribution by 2009. At that point, the various components (except for transport) are to be privatized. In the meantime, Botas is to sell off 10% of its market share every year, eventually getting down to 20%.

In July 2002, TPAO said that it would begin negotiations with Germany's Lurgi Oel Gas Chemie on building Turkey's first natural gas storage unit. The facility would be located 50 miles west of Istanbul on the Marmara Sea coast, and will include equipment to for gas purification. Meanwhile, Botas reportedly plans to build another gas storage plant at Salt Lake (Tuz Golu) in central Anatolia.

In February 2002, faced with strong public opposition to a 200% increase in natural gas prices, the Turkish government ordered a price cut of 6% for households and 10% for businesses.

COAL

Turkey has hard coal (anthracite and bituminous) reserves of around 1.1 billion short tons, plus lignite reserves as high as 8 billion short tons. Around 40% of Turkey's lignite is located in the Afsin-Elbistan basin of southeastern Anatolia, while hard coal is mined only in one location -- the Zonguldak basin of northwestern Turkey. Turkey produced 74 million short tons (Mmst) of coal (mainly lignite) in 2000, and consumed 91 Mmst. Between 1990 and 2000, the number of workers in Turkey's coal sector fell from 63,993 to 35,665. Turkish coal is generally of poor quality and highly polluting. It is used mainly for power generation

ELECTRIC POWER

With a young and growing population, low per capita electricity consumption, rapid urbanization and -- until recently -- strong economic growth, Turkey for nearly two decades has been one of the fastest growing power markets in the world. Projections by Turkey's Electricity Generating and Transmission Corporation (TEAS), a public company which owns and operates 15 thermal and 30 hydroelectric plants generating 91% of Turkey's electricity, indicate that rapid (as high as 9%-10% annual) growth in electricity consumption will continue over the next 15 years (although power demand looks weak for now). With electricity shortages, brownouts, and blackouts already common (in part the result of generation and distribution losses as high as 30%, and in part the result of underinvestment), increasing the country's electricity

generating capacity therefore is a top priority for Turkish energy officials. According to the Ministry of Energy and Natural Resources (MENR), meeting Turkey's power needs could require investments of $4-$4.5 billion per year, much of which would need to come from the private sector. Currently, Turkey has plans for an additional 23,603 megawatts (MW) in power generating capacity by 2020, nearly double the country's 26,226 MW current capacity.

A major dilemma now faced by Turkey is how to invest in new electric power capacity while at the same time adhering to foreign debt ceilings mandated under lending rules set by the IMF. Conventional financing of major infrastructure projects would only increase the amount of foreign credit, thus MENR has conceived other options for financing projects. One option used until now has been the so-called Build, Operate and Transfer (BOT) model, under which private investors build and operate private sector generation facilities for a set number of years, at which point they transfer ownership to the state. First introduced in 1984 (under Law 3096) by then Prime Minister Turgat Ozal, BOT projects have been plagued by legal problems, which has slowed their implementation. In January 2001, the Turkish energy ministry announced 29 BOT power projects, worth $1.5 billion, that are to be the last benefiting from treasury guarantees. The projects are mainly wind and small hydro facilities, with a combined generating capacity of 1,379 MW.

In February 2001, Turkey passed the long-anticipated Electricity Market Law, which paves the way for a free market in power generation and distribution in the country. Among other things, the legislation (which President Sezer signed into law in July 2001) calls for: 1) TEAS to be broken up into separate generation, distribution, and trade companies; 2) trade and generation companies to be privatized, while transmission remains in state hands; and 3) a new regulatory board to be set up which will oversee the Turkish power market, set tariffs, issue licenses, and prevent uncompetitive practices. The new law throws into doubt the fate of dozens of BOT and TOR (transfer-of-operating-rights) power projects. In May 2002, the Energy Ministry put six power plants and nine distribution grids on sale.

Germany's Siemens AG is leading a consortium of companies in building a $1.45-billion, 1,300-MW, coal-fired power plant near Iskenderun, in southern Turkey. The plant is scheduled for completion in 2003 and is to burn imported coal. Aside from this large coal-fired facility, Turkey is mainly focused on increased natural gas use for thermal electric power production. GE Power Systems is supplying natural gas-fired turbine generators worth more than $900 million for three new combined cycle power plants (the 770-MW Adapazari, 1,540-MW Gebze, and 1,520-MW Izmir plants). Combined, the three plants are expected to have nearly 4 gigawatts (GW) of power generating capacity when all three become fully operational later this year. GE also reportedly is supplying power generation equipment and services for construction of a $194-million, 206 MW, gas-fired, BOT power plant for Alapi. This plant is scheduled to enter commercial service in late 2002. Several pipeline projects have been proposed to supply gas to these facilities, as well as several LNG terminals. In addition, Botas is expanding its natural gas transmission network along the Black Sea and the Aegean.

In addition to increasing domestically generated electricity through construction of new power plants, Turkey is looking outside its borders to help meet the country's rapidly growing power demand. In May 1999, for instance, Turkish and Turkmen officials reached agreement on power supplies from Turkmenistan. Turkey already is importing around 3 billion kilowatt-hours (bkwh) from Bulgaria annually, and has signed a memorandum with other Black Sea Economic Cooperation (BSEC) members to look into creation of a regional power grid. Turkey also imports power from Russia (via Georgia) and Iran. In September 2000, Turkey reportedly stated its desire to increase its power imports from Bulgaria to 5 bkwh by 2005. In October 2000, Russia signed an agreement with Turkey to increase its power exports to Turkey through Georgia. Besides direct power purchases from other countries, increased natural gas imports will be used largely for electricity generation, with new LNG terminals to be attached to Independent Power Producer (IPP) gas-fired generation facilities.

Turkey has significant hydroelectric power resources (more than 104 total plants, installed capacity over 10.2 GW), and is developing a great deal more, especially as part of the $32-billion Southeast Anatolia -- GAP -- hydropower and irrigation project. When completed, GAP, which is considered one of the most ambitious water development projects ever undertaken, will include 21 dams, 19 hydro plants (with around 7.5 GW of power generating capacity), and a network of tunnels and irrigation canals. Major Turkish hydro dams as part of the GAP include: Ataturk (2,400 MW capacity); Karakaya (1,800 MW); Ilisu (1,200 MW; the largest hydro project on the Tigris River, but highly controversial due to environmental concerns); Cizre (240 MW); Silvan/Kayser (240 MW); Hakkari (208 MW); Alpaslan II (200 MW); Batman (198 MW); Konaktepe (180 MW); and Karkamis (180 MW).

In July 2000, the Turkish government decided to abandon a planned, but oft-delayed, $4-billion, 1,300-MW nuclear power plant. Three international consortia (AECL of Canada, Westinghouse-Mitsubishi of the United States and Japan, and NPI of France and Germany) had submitted bids to build the plant, which would have been Turkey's first nuclear plant. The project was to have been turnkey and would have been located at Akkuyu, on the southern Mediterranean coast. Reportedly, the plant was killed for financial reasons, although there also had been opposition from environmental and anti-nuclear groups, as well as neighboring countries like Greece. Prime Minister Ecevit said that Turkey was not abandoning nuclear power completely, and would consider building the plant in 10-20 years, particularly if nuclear technology improves.

Turkey is considered to have a large amount of wind, geothermal, and solar power potential. In January 2001, Turkey announced approval for 17 wind and one geothermal BOT power plants. Currently, wind power capacity in Turkey is around 19 MW, with units located all over the country. Potential for wind power may be as high as 120,000 MW, with particularly attractive areas for wind located along Turkey's west coast and in southeastern Anatolia. Solar energy is mainly used for roof-top hot water. Geothermal energy potential is estimated at around 35 GW.

ENVIRONMENT

Turkey's explosive economic growth in the mid-1990s had significant repercussions on the country's environment. Economic growth and energy consumption have gone hand-in-hand, and the effect has been an increasing air pollution in cities that are already suffering from high pollution levels. Although Turkey is beginning to take steps to improve air quality (including a switch towards unleaded gasoline by 2005), the increased number of automobiles on Turkish streets is hampering this effort.

Of special concern to Turkey is the threat of marine pollution, especially from oil transport through the narrow Bosporus Straits. The 12-mile passage is already one of the most difficult in the world to navigate, and increased shipping--from oil and gas imports flowing into Turkey, as well as increased Russian shipping from the Black Sea through the Straits to world markets--raise the possibility of an accident. Collisions in the Straits have resulted in large oil spills, and additional oil shipping from the Caspian Sea region via the Black Sea and the Bosporus could put the Istanbul area at further environmental risk.

Industrial production has meant that Turkey's carbon emissions are on the rise, and Turkey is not a party to the U.N. Framework Convention on Climate Change. Compared to other International Energy Agency countries, Turkey's energy and carbon intensities are low, but per capita energy consumption and per capita carbon emissions are trending upwards.

Turkey has substantial renewable energy resources--especially hydroelectric power--and it is currently constructing a series of dams and hydroelectric power plants. As Turkey looks towards possible European Union membership, it will need to continue utilizing this cleaner energy as a means to achieve sustainable economic development. Turkey also has a great degree of potential for energy efficiency improvements.

COUNTRY OVERVIEW

President: Ahmet Necdet Sezer (since May 5, 2000)
Prime Minister: Bulent Ecevit (since January 11, 1999)
Independence: October 29, 1923 (successor state to the Ottoman Empire)
Population (July 2001E): 66.5 million
Location/Size: Southwest Asia/780,580 sq. km (301,930 sq. mi.), slightly larger than Texas
Major Cities: Ankara (capital), Istanbul, Izmir, Adana
Languages: Turkish (official), Kurdish, Arabic
Ethnic Groups: Turkish (80%), Kurdish (20%)
Religions: Muslim (99.8%, mostly Sunni), other 0.2%
Defense (8/1/98): Army (525,000), Navy (51,000), Air Force (63,000), Coast Guard (2,200), Reserves (378,700)

ECONOMIC OVERVIEW

Economy Minister: Kemal Dervis
Finance Minister: Sumer Oral
Currency: Turkish lira (TL)
Market Exchange Rate (7/25/02): US$1=1,730,000 TL (compared to US1$=640,260 TL on 8/3/00)
Gross Domestic Product (GDP) (2000E, market exchange rates): $200.5 billion
Real GDP Growth Rate (1991-2000 annual average): 3.7% **(2001E):** -7.3% **(2002E):** 2.6%
Consumer Price Inflation Rate (2001E): 54.4% **(2002E):** 40.8%
Unemployment Rate (1Q2002): 11.8%
Current Account Balance (2001E): $3.2 billion **(2002E):** -$3.0 billion
Major Trading Partners: Germany, United States, Italy, France, United Kingdom, Russia
Merchandise Exports (2001E): $35.1 billion (around half going to the EU)
Merchandise Imports (2001E): $39.9 billion
Merchandise Trade Balance (2001E): -$4.8 billion
Major Export Products: Agricultural, textiles, iron, steel

Major Import Products: Oil, machinery, chemicals, iron, steel
Foreign Currency Reserves (non-gold; 6/02): $22.3 billion
Foreign Debt (1Q2002): $117.5 billion

ENERGY OVERVIEW

Minister of Energy and Natural Resources: Zeki Cakan (replaced Cumhur Esumer on May 9, 2001)
Proven Oil Reserves (1/1/02E): 296 million barrels
Oil Production (2001E): 56,142 barrels per day (bbl/d) of which 52,142 bbl/d was crude oil
Oil Consumption (2001E): 617,000 bbl/d
Net Oil Imports (2001E): 560,858 bbl/d
Crude Oil Refining Capacity (1/1/02E): 719,275 bbl/d
Natural Gas Reserves (1/1/02E): 310 billion cubic feet (Bcf)
Natural Gas Production (2000E): 23 Bcf
Natural Gas Consumption (2000E): 520 Bcf (more than triple the 150 Bcf consumed in 1991; estimated 706 Bcf in 2002)
Net Natural Gas Imports (2000E): 497 Bcf
Coal Production (2000E): 74.2 million short tons (Mmst)
Coal Consumption (2000E): 90.8 Mmst
Net Coal Imports (2000E): 16.6 Mmst
Estimated Recoverable Coal (2000E): 4.1 billion short tons
Electric Generation Capacity (2000E): 26 gigawatts (44% hydroelectric, 28% coal/lignite, 18% gas, and 9% fuel oil as of 1998)
Electricity Generation (2000E): 119.2 terawatthours (Twh)
Electricity Consumption (2000E): 114.2 Twh (up sharply from 54.0 Twh in 1991)

ENVIRONMENTAL OVERVIEW

Minister of Environment: Fevzi Aytekin
Total Energy Consumption (2000E): 3.2 quadrillion Btu* (0.8% of world total energy consumption)
Energy-Related Carbon Emissions (2000E): 55.0 million metric tons of carbon (0.9% of world total carbon emissions)

Per Capita Energy Consumption (2000E): 47.5 million Btu (vs. U.S. value of 350 million Btu)
Per Capita Carbon Emissions (2000E): 0.8 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (2000E): 15,533 Btu/$1995 (vs U.S. value of 10,918 Btu/$1995)**
Carbon Intensity (2000E): 0.27 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1995)**
Sectoral Share of Energy Consumption (1998E): Industrial (51.3%), Residential (26.6%), Transportation (16.3%), Commercial (5.8%)
Sectoral Share of Carbon Emissions (1998E): Industrial (55.5%), Transportation (20.2%), Residential (19.4%), Commercial (5.0%)
Fuel Share of Energy Consumption (2000E): Oil (41.5%), Coal (30.6%), Natural Gas (16.9%)
Fuel Share of Carbon Emissions (1999E): Oil (43.4%), Coal (42.9%), Natural Gas (13.7%)
Renewable Energy Consumption (1998E): 746 trillion Btu* (4% increase from 1997)
Number of People per Motor Vehicle (1998): 12.3 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Turkey is not a signatory to the United Nations Framework Convention on Climate Change or to the Kyoto Protocol.
Major Environmental Issues: Water pollution from dumping of chemicals and detergents; air pollution, particularly in urban areas; deforestation; concern for oil spills from increasing Bosporus ship traffic.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Antarctic Treaty, Biodiversity, Desertification, Hazardous Wastes, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Wetlands and Whaling. Has signed, but not ratified, Antarctic-Environmental Protocol and Environmental Modification. Has not signed the UN Framework Convention on Climate Change.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric

power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000

OIL AND GAS INDUSTRIES
State Oil Company: Turkish State Petroleum Company (TPAO)
State Refining Company: Turkish Petroleum Refineries Corporation (Tupras)
State Pipelines and Gas Agency: Botas
State Oil Products Retailer: Petrol Ofisi AS (POAS)
Major Ports: Iskenderun, Istanbul, Mersin, Izmir
Major Oil and Gas Fields: Bati Raman, Karakus, K. Karakus
Major Pipelines: Turkey-Iraq ; Turkey contains 1,078 miles of crude oil pipelines, 1,439 miles of oil product pipelines, and 439 miles of natural gas pipelines
Major Refineries (crude oil capacity): Izmit (251,600 bbl/d), Aliaga-Izmir (226,440 bbl/d), Kirikkale (113,200 bbl/d), Mersin (100,000 bbl/d), Batman-Siirt (22,015 bbl/d); Kahramanmaras (6,000 bbl/d) *Sources for this report include: Agence France Presse; Alexander's Gas and Oil Connections; APS Review Market Trends; Associated Press Newswires; BBC Summary of World Broadc*

Sources for this report include: Agence France Presse; Alexander's Gas and Oil Connections; APS Review Market Trends; Associated Press Newswires; BBC Summary of World Broadcasts; Cambridge Energy Research Associates; CIA World Factbook 2001; CSIS Caspian Energy Update; DRI/WEFA; Deutsche Bank special report, "Turkey: Winning the Gas Import Race;" Dow Jones Newswires; Economist Intelligence Unit Country Reports, ViewsWire; Energy Day; Energy Report; Financial Times; Global Power Report; Hart's European Petroleum Finance Week; Hart's Oil and Gas Investor;

International Energy Agency; International Monetary Fund; International Water Power and Dam Construction; Middle East Economic Digest; National Post (Canada); New York Times; Oil Daily; Oil and Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; Reuters; PR Newswire; Turkish Daily News; Turkish Probe; U.S. Energy Information Administration; Wall Street Journal; Washington Post; World Gas Intelligence; World Markets Online.

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Links to other U.S. government sites:
2001 CIA World Factbook - Turkey
U.S. Department of Energy's Office of Fossil Energy's International section - Turkey
U.S. State Department's Consular Information Sheet - Turkey (April 30, 2002)
US State Department's Country Commercial Guide - Turkey FY 2002
Library of Congress Country Study on Turkey (September 1987)
Information from the U.S. International Trade Administration

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July 2001

Turkey

Turkey's strategic location makes it a natural "energy bridge" between major oil producing areas in the Middle East and Caspian Sea regions on the one hand, and consumer markets in Europe on the other. Turkey's port of Ceyhan is an important outlet both for current Iraqi oil exports as well as for potential future Caspian oil exports. Turkey's Bosporus Straits are a major shipping "choke point" between the Black and Mediterranean Seas. Finally, Turkey is a rapidly growing energy consumer in its own right.

Note: Information contained in this report is the best available as of July 2001 and can change.

RECENT DEVELOPMENTS

Turkey is currently in the midst of a serious economic crisis, which began in November/December 2000, and worsened sharply in February 2001. The crisis was triggered in part by underlying economic weaknesses (i.e., current account deficits, severe problems in the banking sector), in part by political instability, and in part by the failure of a December 1999 structural reform package agreed to as part of an International Monetary Fund (IMF) loan package. Among other problems since late 2000/early 2001, Turkey's "crawling peg" exchange rate regime has collapsed, with the lira plummeting in value by more than 50% (as of mid-July). Turkey also has seen a resurgence in the inflation rate, as well as sharply higher interest rates. In response to this situation, the IMF announced on May 15 that it would provide Turkey with $8 billion in new aid, on top of the $7.5 billion in IMF funds pledged in late 2000. In addition to this huge package from the IMF (the largest in its history), the World Bank promised $2-$2.5 billion (on top of $5 billion it had pledged in December 2000). The first tranche -- $3.8 billion -- of the IMF's bailout package for Turkey was released in May. Further tranches depend upon Turkey carrying out a significant reform plan aimed at addressing the root causes of the country's economic problems. (On July 12, the IMF released another $1.5 billion.) Among other things, Turkey has pledged to cut state spending and subsidies, reform the banking sector, privatize state-owned industries (including

the debt-ridden energy sector), increase transparency, and reduce inflation. Political, labor, and public opposition to much of this program could make it signifantly more difficult to proceed with this plan, however.

Stabilizing the economy and preventing a full-scale banking crisis are perhaps Turkey's greatest challenges at the moment. In July 2001, for instance, despite action by the Turkish central bank to hike interest rates (to 67%), investors continued pulling their money out of Turkey and the country's currency continued to fall sharply. Turkey faces a predicted sharp (5%) decline in real real Gross Domestic Product (GDP) during 2001, following an increase of 7.1% in 2000. (GDP fell by 4.7% in 1999 in large part due to a major earthquake in the central part of the country.) Turkey's economy grew at a 3.7% average annual rate between 1991 and 2000, with annual inflation of around 65%-85%. In 2001, inflation is projected at around 60%, and the country's fiscal position is expected to deteriorate sharply. Turkey's financial crisis also has complicated the country's structural reform and privatization programs. In early March 2001, Kemal Dervis (an economist and World Bank vice president) was appointed state minister with wide-ranging responsibility for the economy.

Even prior to its recent economic crises, Turkey faced numerous economic challenges, including: a large "underground" economy (estimated at 30%-100% of the reported economy); sharp income inequalities (between urban and rural areas in particular); low levels of private investment (Turkey hopes to increase this dramatically); a large, inefficient state sector; and a failure to generate sufficient jobs for the country's rapidly growing population. In addition, Turkey faced (and continues to face) a high debt repayment burden.

In 2000, Turkey privatized 51% of formerly state-owned petroleum distributor Petrol Ofisi -- POAS -- as well as 31.5% of state oil refinery Tupras, for a total of $2.3 billion. In July 2001, Ugur Bayar, the head of Turkey's privatization administration, announced that the government intended to hold another public offering on Tupras in late 2001, with the aim of reducing the government's share to below 50%. Turkey also hopes to partially privatize state-owned pipeline company Botas. In May 2001, Turkey passed a law liberalizing the country's gas market, and also ending Botas' monopoly over gas imports. This law will promote competition and also move Turkish law closer to norms of the European Union, which Turkey would like to join.

ENERGY

Despite the growth in the private sector in recent years, developments in the Turkish energy sector are still heavily influenced by the central government. The main energy decision-making body is the Ministry of Energy and Natural Resources (ETKB), currently headed by Zeki Cakan. Cakan replaced Cumhur Ersumer after Ersumer resigned in April 2001 due to the "white energy" corruption scandal (over awards for power plant projects as well as for parts of the giant "Blue Stream" gas pipeline project).

Generally speaking, Turkey's energy consumption is growing much faster than its production,

making Turkey a rapidly growing energy importer. Also, Turkey currently is experiencing significant energy shortfalls. This will necessitate billions of dollars worth of investments in coming years. On April 5, 2001, Turkey announced that it had ratified the Energy Charter Treaty, the international legal framework for energy investment.

OIL

Turkish oil consumption has increased in recent years, and this trend is expected to continue, with growth of 2%-3% annually in coming years. Oil provides around 43% of Turkey's total energy requirements, but its share is declining (as the share of natural gas rises). Around 90% of Turkey's oil supplies are imported, mainly from the Middle East and Russia. Turkish imports from Saudi Arabia have declined in recent years as Iraqi oil supplies have gradually increased. Turkey's port of Ceyhan is a major outlet for Iraqi oil exports.

Turkey's oil production is accounted for primarily by three companies -- the Turkish State Petroleum Company (TPAO), and foreign operators Royal Dutch/Shell (Shell) and ExxonMobil. TPAO alone accounts for about three-quarters of the country's oil output, currently running around 63,000 barrels per day (bbl/d), down from 90,000 bbl/d in 1991. Turkish oil fields are generally small, and scattered around the country. Oil fields in the country's southeast (specifically the Hakkari Basin, Turkey's main oil producing area) are generally old and expensive to exploit. In addition to the Hakkari Basin, Turkey contains oil prospects in its European provinces, in the Black Sea shelf region, and in other oil basins in southern and southeastern Turkey. Potential oil reserves in the Aegean Sea have not been explored due to conflicting Greek claims over the area.

In September 1994, TPAO became part of the Azerbaijan International Operating Company (AIOC), a consortium of foreign oil companies in a multi-billion dollar oil production-sharing agreement with Azeri state oil company SOCAR to develop three offshore oil fields in the Caspian Sea region. TPAO holds a 6.75% share in AIOC. TPAO has established an oil exploration company in Kazakhstan (Kazakhturkmunay)as well, and also is active in other areas of the world, including the Middle East and North Africa.

For several years, it has been reported that as much as 100,000 bbl/d of oil and oil products were being smuggled into Turkey via tanker truck, mainly from northern Iraq. This "border trade" costs the Turkish treasury millions of dollars in lost tax revenue. In March 2000, Turkey's National Security Council (MGK), concerned at lost tax revenues as well as harm to state companies Poas and Tupras, imposed controls on petroleum product smuggling from Kurdish areas of northern Iraq, Iran, Georgia, the Azeri enclave of Nakhchevan, Syria, and Bulgaria. A previous crackdown on smuggling in May 1999 reportedly had little effect.

Pipelines

Oil and gas transportation is a crucial and contentious issue in the Caspian Sea/Central Asia regions. Turkey and the United States have been pressing for a "Western route" pipeline that

would carry oil from Azerbaijan's port of Baku through Azerbaijan and Georgia and then across Turkey to Ceyhan, at an estimated cost of $1.8-$4 billion. This would be a major part of the proposed "Eurasian Corridor" to bring Caspian oil and gas to international markets via Turkey, and to bypass Russia and Iran. Russia, on the other hand, is promoting a "Northern route" across the Caucasus to the Russian Black Sea port of Novorossiysk. From there, oil would be transported through the Bosporus (which Turkey claims is too crowded already, and a potential danger to Istanbul) or via a proposed pipeline from Bulgaria to Greece and the rest of Europe. Other proposals include a pipeline to Georgia's Black Sea port of Supsa, and a swap arrangement with, or export pipeline through, Iran.

One advantage which Baku-Ceyhan has over other potential options for Caspian oil transport is that Ceyhan can handle Very Large Crude Carriers (VLCCs), while the ports of Supsa (Georgia) and Novorossiysk (Russia) are restricted to smaller LR-2 tankers which can transit the Bosporus. Another advantage for Ceyhan is that it can remain open all year, compared to Novorossiysk, which is closed up to 2 months per year due to bad weather. In October 2000, SOCAR signed an agreement in Baku with a group of seven international oil companies that agreed to finance a $25-million basic engineering feasibility study on construction of the planned pipeline, and Turkey, Azerbaijan, and Georgia already have approved the final route. Members of the group of sponsors will automatically become members of a company called the Main Export Pipeline Company (MEPCO). In February 2001, Chevron, which, along with ExxonMobil, has long opposed Baku-Ceyhan, decided to join the group of sponsors, becoming the first oil company outside of AIOC (which is developing the Azeri-Chirag-Gunashli deposits that will provide much of the oil for export) to join the sponsorship group.

The cost of the Baku-Ceyhan route has been a major issue, despite Turkey's assertions that Baku-Ceyhan would be economically viable. Another key question is the volume of oil available for the pipeline; as of early 2001, AIOC's production was around 118,000 bbl/d, compared to the 1 million bbl/d which some analysts have cited as needed to make the pipeline economical. AIOC has stated that the planned Phase-1 program to develop the Azeri-Chirag-Gunashli block, which will increase production to 400,000 bbl/d, will not begin until 2004-2005. In effect, full-scale development of the AIOC project will be delayed until a decision has been made on export options, including whether this oil will be exported via the proposed Baku-Ceyhan pipeline. On the plus side, BP, leader of the AIOC consortium, appears to have decided to throw its support behind the Baku-Ceyhan pipeline. BP had been opposed to the project, citing doubts that enough oil has been found to justify the high costs. BP reportedly has revised downwards its estimate for the amount of oil reserves needed to make the pipeline economical, from 6 billion barrels to a more achievable 4 billion-4.5 billion barrels. With the results of the basic engineering study due in May 2001, BP is set to announce the results of a tender to find a company to carry out a final, $150-million, detailed study for the pipeline in late June 2001. If the pipeline progresses on schedule, construction could begin by late 2001-early 2002, and oil could flow before the end of 2004.

Refining/Downstream

Turkey has refining capacity of 694,115 bbl/d at 6 refineries. Refining and other downstream operations in Turkey are dominated by partly-state-owned company Tupras, which has four main refining complexes: Batman in the southeast, Aliaga near Izmir, Izmit near Istanbul (the country's largest refinery, damaged during the August 1999 earthquake), and the Central Anatolian Refinery at Kirikkale near Ankara. In 2000, Tupras' market share of the Turkish refining sector was around 86%. Tupras has a modernization program designed to switch output at its refineries towards lighter products. Turkey's sole private refinery is ATAS, near Mersin on the Mediterranean coast, a joint venture of Mobil (51%), Shell (27%), BP Amoco (17%), and local company Marmara Petrol ve Rafineri Isleri AS (5%).

NATURAL GAS

Current Turkish gas production (30 billion cubic feet -- Bcf -- at 14 fields) meets around 7% of domestic gas consumption requirements. Major gas producers in Turkey include Arco, TPAO and Shell. Marmara Kuzey (North Marmara), which came onstream in May 1997, is the country's largest non-associated gas field. Marmara Kuzey is located offshore in the Thrace-Gallipoli Basin of the Sea of Marmara. In late 2000, additional gas was discovered in the Thrace basin, with production potential as high as 100 Bcf per year. Also, in July 2001, TPAO announced that it had found gas in the Mersin and Iskenderun bays in Turkish areas of the Mediterranean. It is unlikely, however, that these new gas reserves will significantly alter Turkey's need for sharply increased gas imports in coming years. Currently, most Turkish associated gas is reinjected into oilfields as part of an Enhanced Oil Recovery (EOR) system.

Turkish natural gas demand is projected to increase rapidly in coming years, with the prime consumers expected to be power plants and industrial users. Natural gas is Turkey's preferred fuel for new power plant capacity for several reasons: environmental (gas is cleaner than coal, lignite, or oil); geographic (Turkey is close to huge amounts of gas in the Middle East and Central Asia); economic (Turkey could offset part of its energy import bill through transit fees it could charge for oil and gas shipments across its territory); and political (Turkey is seeking to strengthen relations with Caspian and Central Asian countries, several of which are potentially large gas exporters). The United States, among others, has been encouraging Turkey to utilize its unique geographical position to become a major transit center for natural gas from the Caspian/Central Asia to Europe.

Turkey consumed 444 Bcf of natural gas (nearly all imported) in 1999, accounting for around 17% of Turkey's total energy consumption. Around 70% of current Turkish gas imports come from Russia via the trans-Balkan pipeline, with the other 30% coming mainly from Algeria and Nigeria via LNG tanker. Turkey has signed (or discussed) gas import deals with a variety of countries, including Azerbaijan, Egypt, Iran, Iraq, Russia, and Turkmenistan. Many analysts are highly skeptical, however, of Turkey's rapid gas demand growth forecasts, in part over Turkey's financial ability to construct gas-fired power plants, as well as new pipelines and/or liquefied natural gas (LNG) facilities, quickly enough. Turkey's current severe economic problems create even more skepticism over optimistic gas demand growth forecasts. In May 2001, Turkey announced delays in two major natural gas import projects -- with Iran and Russia -- possibly in

response to its economic slowdown (although Turkey cited technical reasons for the delay). To date, Turkey has signed deals for around 850-880 Bcf per year of gas imports beginning in 2004, nearly double current Turkish gas consumption. Of this total, around 40% is expected is expected to come from Russia via Bulgaria, with 33% supplied from Russia via the Black Sea (see "Blue Stream" below), 17% from Iran, and 8% from Azerbaijan. Most analysts believe that this volume of gas is significantly higher than Turkish demand will be able to support in 2004, which raises the question of whether or not Turkey has signed up for too much gas. Also, Turkey's reliance on Russia for gas imports could be greater than 70%, which seems to undercut Turkey's goal of diversifying fuel suppliers.

On December 15, 1997, Russia and Turkey signed a 25-year deal under which the Russian gas company, Gazprom, would construct a new gas export pipeline (called "Blue Stream") to Turkey for delivery capacity of around 565 Bcf annually, with initial deliveries possibly starting in 2002. The $2.7-$3.2 billion, 758-mile dual pipeline is slated to run from Izobilnoye in southern Russia, to Dzhugba on the Black Sea, then under the Black Sea for about 247 miles to the Turkish port of Samsun, and on to Ankara. When completed, possibly by early 2002 (in May 2001, Botas said that Russian gas would begin flowing through Blue Stream no later than February 2002), the Blue Stream lines will be the world's deepest underwater gas pipelines, and will require complex engineering to construct the pipeline (including a corrosive environment due to high concentrations of hydrogen sulfide at the bottom of the Black Sea). The two main companies involved in Blue Stream are Russia's Gazprom and Italy's ENI SpA. Eventually, Blue Stream project could be extended onwards to other Mediterranean countries, including Greece.

Pipe laying on Blue Stream is expected to begin in July or August 2001, with work set to take three months. In June 2000, Turkey's parliament ratified an annex protocol to the Blue Stream agreement, granting tax exemptions to investors in the project. Turkey's overland section of Blue Stream is expected to cost $339 million. Blue Stream is controversial for several reasons, including technical (the line must cross the Black Sea at points as deep as 1.2 miles, and pass through corrosive hydrogen sulfide deposits) and political/national security (i.e., increased dependence on Russia). There are also questions as to the price of gas ($3.40 per cubic foot) from Russia via Blue Stream, as compared to a possibly lower price (possibly $2.12 per cubic foot) for Turkmeni or Azerbaijani (Shah Deniz) gas. Finally, Blue Stream could make it much less likely that Turkey will require natural gas imports from Turkmenistan anytime soon.

Arguably, Turkey's most controversial gas import deal is one with Iran, signed in 1996. Under this 23-year arrangement, Iran will supply Turkey with gas, mainly from the Kangan gas field in the south and the Khangiran gas field in the northeast. Iran also imports gas from Turkmenistan, and could send spare volumes to Turkey as well. In January 2000, Turkey and Iran announced agreement on postponing the 23-year gas deal's start to July 2001, more than a year behind schedule, purportedly due to lack of completion of two pipeline stages in Turkey (U.S. opposition to Turkey's deal with Iran may also have been a factor). In late June 2001, the gas deal was delayed once again, at least until the end of July, as Turkey claimed that Iran had

failed to complete a metering station at the border. Iran reportedly was offering to construct a temporary metering station on the Turkish side of the border, but Turkey reportedly had rejected the offer. The 46-inch 160-mile (260-km) line runs from Dogubeyazit, on the Iranian border, to Erzurum, Turkey. From Erzurum, the pipeline is to extend to Sivas, and then on to Ankara. Iranian gas used to supply the pipeline is to come from the non-associated Kangan fields as well as from associated sources around Ahwaz. Since Turkey is merely trading with Iran, the United States has determined that Turkey technically is not in violation of the Iran-Libya Sanctions Act (ILSA), which imposes sanctions on companies *investing* more than $20 million in Iran's oil or gas industries. For its part, Turkey has steadfastly maintained that it needs to diversify its suppliers of natural gas away from Russia and that Turkmen and Iranian gas represent economically sound alternatives.

On May 21, 1999, Botas signed an agreement on building a $2-$2.4 billion, 1,050-mile, gas pipeline from Turkmenistan, underneath the Caspian Sea, across Azerbaijan and Georgia (both of which would collect transit fees), and on to Turkey. Gas deliveries of 565-1,060 Bcf per year are possible, with additional gas possibly being sent onwards to Europe. The consortium is led by U.S. company Bechtel and including General Electric, Shell, and PSG International. In mid-July 1999, a top Turkish energy official stated that the Trans-Caspian Pipeline (TCP) from Turkmenistan was still the preferred option for Turkey despite the potentially huge (as high as 35 trillion cubic feet -- Tcf) Shah Deniz gas field in Azerbaijan, which is located hundreds of miles closer (and on the western side of the Caspian Sea) to Turkey than Turkmenistan.

Despite previous Turkish government statements that a gas pipeline from Turkmenistan was a top priority, this now seems highly unlikely, as it would compete against the proposed Blue Stream project, as well as against possible gas supplies from Iran and, especially, Azerbaijan. Gas deliveries from Azerbaijan's Shah Deniz field -- 51% controlled by BP Amoco and Statoil -- could begin in 2004 (two years later than originally planned), with Turkey and Azerbaijan having signed a 15-year deal to this effect in March 2001. Turkey claims that its gas demand growth will be fast enough to support multiple pipelines, but many analysts believe Turkey's forecasts are unrealistic, and that only one of the main options (i.e., Blue Stream, TCP, Shah Deniz) -- can be supported for some time. Meanwhile, progress on the TCP appears stalled at the moment, with the international consortium essentially having suspended operations, while Blue Stream appears to be proceeding. On July 31, 2000, Shell said that time was running out for Turkmenistan if it wanted to proceed with the TCP, and that the more convenient gas supplies of Shah Deniz in Azerbaijan could supplant Turkmen gas. Turkmen President Niyazov has insisted on upfront payment of hundreds of millions of dollars from the international consortium, and recently has discussed the possibility of exporting more of its gas to Russia.

Egypt, with huge gas reserves of its own, is another possible source of gas for Turkey, either by pipeline or via LNG tanker. This latter option would include construction of a $1.2-billion liquefaction terminal near Port Said on the Mediterranean coast, and a regasification facility at Izmir in Turkey. Egypt and Turkey signed a preliminary agreement for LNG exports in 1996, but analysts have raised serious questions about whether the project is economically feasible. Also,

given the fact that Turkey already has committed to buying more gas than it probably needs for years to come, it is hard to see how Egyptian gas will fit into the picture. Still, new LNG terminals in Turkey are being planned, besides the sole existing, 140-Bcf capacity, terminal adjacent to the existing Marmara Ereglisi combined cycle gas turbine power station. Other possibilities include a regasification terminal at Aliaga (near Izmir on the Aegean Sea), an LNG terminal at Iskenderun on the Mediterranean, and even the world's first floating LNG terminal.

COAL

Turkey has hard coal (anthracite and bituminous) reserves of around 1.1 billion short tons, plus lignite reserves as high as 8 billion short tons. Around 40% of Turkey's lignite is located in the Afsin-Elbistan basin of southeastern Anatolia, while hard coal is mined only in one location -- the Zonguldak basin of northwestern Turkey. Turkey produced 74 million short tons (Mmst) of coal (mainly lignite) in 1999, and consumed 84 Mmst. Between 1990 and 2000, the number of workers in Turkey's coal sector fell from 63,993 to 35,665.

ELECTRIC POWER

With a young and growing population, low per capita electricity consumption, rapid urbanization and -- until recently -- strong economic growth, Turkey for nearly two decades has been one of the fastest growing power markets in the world. Projections by Turkey's Electricity Generating and Transmission Corporation (TEAS), a public company which owns and operates 15 thermal and 30 hydroelectric plants generating 91% of Turkey's electricity, indicate that rapid (as high as 9%-10% annual) growth in electricity consumption will continue over the next 15 years. With electricity shortages, brownouts, and blackouts already common (in part the result of generation and distribution losses as high as 20%, and in part the result of underinvestment), increasing the country's electricity generating capacity therefore is a top priority for Turkish energy officials. According to the Ministry of Energy and Natural Resources (MENR), meeting Turkey's power needs could require investments of $4-$4.5 billion per year, much of which would need to come from the private sector. Currently, Turkey has plans for an additional 23,603 megawatts (MW) in power generating capacity by 2020, nearly double the country's 26,226 MW current capacity. According to *International Private Power Quarterly*, published by *Platts*, there are 26 power projects currently under development in Turkey totalling 11,990 MW. There are also 3 power projects under construction, totalling 1,652 MW.

A major dilemma now faced by Turkey is how to invest in new electric power capacity while at the same time adhering to foreign debt ceilings mandated under lending rules set by the IMF. Conventional financing of major infrastructure projects would only increase the amount of foreign credit, thus MENR has conceived other options for financing projects. One option used until now has been the so-called Build, Operate and Transfer (BOT) model, under which private investors build and operate private sector generation facilities for a set number of years, at which point they transfer ownership to the state. First introduced in 1984 (under Law 3096) by then Prime Minister Turgat Ozal, BOT projects have been plagued by legal problems, which has slowed their implementation. Several BOT plants currently are under construction, including gas-fired units at Marmara Ereglisi and Istanbul, and a $1.6-billion, 672-MW hydro

project at Birecik on the Euphrates River (due for completion in 2001). In January 2001, the Turkish energy ministry announced 29 BOT power projects, worth $1.5 billion, that are to be the last benefiting from treasury guarantees. The projects are mainly wind and small hydro facilities, with a combined generating capacity of 1,379 MW.

In February 2001, Turkey passed the long-anticipated Electricity Market Law, which paves the way for a free market in power generation and distribution in the country. Among other things, the legislation (which President Sezer signed into law in July 2001) calls for: 1) TEAS to be broken up into separate generation, distribution, and trade companies; 2) trade and generation companies to be privatized, while transmission remains in state hands; and 3) a new regulatory board to be set up which will oversee the Turkish power market, set tariffs, issue licenses, and prevent uncompetitive practices. The new law throws into doubt the fate of dozens of BOT and TOR (transfer-of-operating-rights) power projects.

Germany's Siemens AG is leading a consortium of companies in building a $1.45-billion, 1,300-MW, coal-fired power plant near Iskenderun, in southern Turkey. The plant is scheduled for completion in 2003 and is to burn imported coal. Aside from this large coal-fired facility, Turkey is mainly focused on increased natural gas use for thermal electric power production. GE Power Systems is supplying natural gas-fired turbine generators worth more than $900 million for three new combined cycle power plants (the 770-MW Adapazari, 1,540-MW Gebze, and 1,520-MW Izmir plants). Combined, the three plants are expected to have nearly 4 gigawatts (GW) of power generating capacity when they are completed in 2002/2003. GE also reportedly is supplying power generation equipment and services for construction of a $194-million, 206 MW, gas-fired, BOT power plant for Alapi. This plant is scheduled to enter commercial service in late 2002. Several pipeline projects have been proposed to supply gas to these facilities, as well as several LNG terminals. In addition, Botas is expanding its gas transmission network along the Black Sea and the Aegean.

In addition to increasing domestically generated electricity through construction of new power plants, Turkey is looking outside its borders to help meet the country's rapidly growing power demand. In May 1999, for instance, Turkish and Turkmen officials reached agreement on power supplies from Turkmenistan. Turkey already is importing around 3 billion kilowatt-hours (bkwh) from Bulgaria annually, and has signed a memorandum with other Black Sea Economic Cooperation (BSEC) members to look into creation of a regional power grid. Turkey also imports power from Russia (via Georgia) and Iran. In September 2000, Turkey reportedly stated its desire to increase its power imports from Bulgaria to 5 bkwh by 2005. In October 2000, Russia signed an agreement with Turkey to increase its power exports to Turkey through Georgia. Besides direct power purchases from other countries, increased natural gas imports will be used largely for electricity generation, with new LNG terminals to be attached to Independent Power Producer (IPP) gas-fired generation facilities.

Turkey has significant hydroelectric power resources (more than 104 total plants, installed capacity over 10.2 GW), and is developing a great deal more, especially as part of the $32-

billion Southeast Anatolia -- GAP -- hydropower and irrigation project. When completed, GAP, which is considered one of the most ambitious water development projects ever undertaken, will include 21 dams, 19 hydro plants (with around 7.5 GW of power generating capacity), and a network of tunnels and irrigation canals. Major Turkish hydro dams as part of the GAP include: Ataturk (2,400 MW capacity); Karakaya (1,800 MW); Ilisu (1,200 MW; the largest hydro project on the Tigris River); Cizre (240 MW); Silvan/Kayser (240 MW); Batman (198 MW); and Karkamis (180 MW). As of 2000, six GAP hydro plants (Karakaya, Ataturk, Kralkizi, Dicle, Batman, and Karkamis) were in operation; three plants (Birecik, Kayacik, Sanliurfa) were under construction, and six more (Erkenek, Garzan, Silvan, Adiyaman, Ilisu, Cizre) were planned.

In July 2000, the Turkish government decided to abandon a planned, but oft-delayed, $4-billion, 1,300-MW nuclear power plant. Three international consortia (AECL of Canada, Westinghouse-Mitsubishi of the United States and Japan, and NPI of France and Germany) had submitted bids to build the plant, which would have been Turkey's first nuclear plant. The project was to have been turnkey and would have been located at Akkuyu, on the southern Mediterranean coast. Reportedly, the plant was killed for financial reasons, although there also had been opposition from environmental and anti-nuclear groups, as well as neighboring countries like Greece. Prime Minister Ecevit said that Turkey was not abandoning nuclear power completely, and would consider building the plant in 10-20 years, particularly if nuclear technology improves.

Turkey is considered to have a large amount of wind, geothermal, and solar power potential. In January 2001, Turkey announced approval for 17 wind and one geothermal BOT power plants. Currently, wind power capacity in Turkey is around 19 MW, with units located all over the country. Potential for wind power is especially high on Turkey's west coast and in southeastern Anatolia. Solar energy is mainly used for roof-top hot water. Geothermal energy potential is estimated at around 35 GW.

ENVIRONMENT

Turkey's explosive economic growth in the mid-1990s was not without repercussions for the country's environment. Economic growth and energy consumption have gone hand-in-hand, and the effect has been an increasing air pollution in cities that are already suffering from high pollution levels. Although Turkey is beginning to take steps to improve air quality (including a switch towards unleaded gasoline by 2005), the increased number of automobiles on Turkish streets is hampering this effort.

Of special concern to Turkey is the threat of marine pollution, especially from oil transport through the narrow Bosporus Straits. The 12-mile passage is already one of the most difficult in the world to navigate, and increased shipping--from oil and gas imports flowing into Turkey, as well as increased Russian shipping from the Black Sea through the Straits to world markets--raise the possibility of an accident. Collisions in the Straits have resulted in large oil spills, and additional oil shipping from the Caspian Sea region via the Black Sea and the Bosporus could

put the Istanbul area at further environmental risk.

Industrial production has meant that Turkey's carbon emissions are on the rise, and Turkey is not a party to the U.N. Framework Convention on Climate Change. Compared to other International Energy Agency countries, Turkey's energy and carbon intensities are low, but per capita energy consumption and per capita carbon emissions are trending upwards.

Turkey has substantial renewable energy resources--especially hydroelectric power--and it is currently constructing a series of dams and hydroelectric power plants. As Turkey looks towards possible European Union membership later in the 21st century, it will need to continue utilizing this cleaner energy as a means to achieve sustainable economic development. Turkey also has a great degree of potential for energy efficiency improvements.

COUNTRY OVERVIEW

President: Ahmet Necdet Sezer (since May 5, 2000)
Prime Minister: Bulent Ecevit (since January 11, 1999)
Independence: October 29, 1923 (successor state to the Ottoman Empire)
Population (2001E): 67.7 million
Location/Size: Southwest Asia/780,580 sq. km (301,930 sq. mi.), slightly larger than Texas
Major Cities: Ankara (capital), Istanbul, Izmir, Adana
Languages: Turkish (official), Kurdish, Arabic
Ethnic Groups: Turkish (80%), Kurdish (20%)
Religions: Muslim (99.8%, mostly Sunni), other 0.2%
Defense (8/1/98): Army (525,000), Navy (51,000), Air Force (63,000), Coast Guard (2,200), Reserves (378,700)

ECONOMIC OVERVIEW

Economy Minister: Kemal Dervis
Currency: Turkish lira (TL)
Market Exchange Rate (7/17/01): US$1=1,500,000 TL (compared to US1$=640,260 TL on 8/3/00)
Gross Domestic Product (GDP) (2000E, market exchange rates): $200.5 billion
Real GDP Growth Rate (1991-2000 annual average): 3.7% **(2000E):** 7.1% **(2001E):** -5.0%
Consumer Price Inflation Rate (2000E): 55% **(2001E):** 60.4%
Current Account Balance (2000E): -$9.8 billion **(2001E):** $3.6 billion
Major Trading Partners: Germany, United States, Italy, France, United Kingdom, Russia
Merchandise Exports (2000E): $31.2 billion (around half going to the EU)
Merchandise Imports (January-May 2000E): $20.3 billion
Merchandise Trade Balance (January-May 2000E): -$7.8 billion
Major Export Products: Agricultural, textiles, iron, steel
Major Import Products: Oil, machinery, chemicals, iron, steel
Foreign Currency Reserves (non-gold; 7/00): $23.2 billion

ENERGY OVERVIEW

Minister of Energy and Natural Resources: Zeki Cakan (replaced Cumhur Esumer on May 9, 2001)
Proven Oil Reserves (1/1/01): 296 million barrels
Oil Production (2000E): 63,000 barrels per day (bbl/d) of which 59,000 bbl/d is crude oil
Oil Consumption (2000E): 664,000 bbl/d
Net Oil Imports (2000E): 601,000 bbl/d
Crude Oil Refining Capacity (1/1/01): 694,115 bbl/d
Natural Gas Reserves (1/1/01E): 310 billion cubic feet (Bcf)
Natural Gas Production (1999E): 30 Bcf
Natural Gas Consumption (1999E): 444 Bcf
Net Natural Gas Imports (1999E): 414 Bcf
Coal Production (1999E): 74.1 million short tons (Mmst)
Coal Consumption (1999E): 83.7 Mmst
Net Coal Imports (1999E): 9.6 Mmst
Estimated Recoverable Coal (1998E): 1.2 billion short tons
Electric Generation Capacity (2000E): 26 gigawatts (44% hydroelectric, 28% coal/lignite, 18% gas, and 9% fuel oil as of 1998)
Electricity Generation (1999E): 77.0 terawatthours (Twh)
Electricity Consumption (1999E): 105.7 Twh

ENVIRONMENTAL OVERVIEW

Minister of Environment: Fevzi Aytekin
Total Energy Consumption (1999E): 2.9 quadrillion Btu* (0.8% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 50.0 million metric tons of carbon (0.8% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 45.9 million Btu (vs. U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 0.8 metric tons of carbon (vs. U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 14,850 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**
Carbon Intensity (1999E): 0.25 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (51.3%), Residential (26.6%), Transportation (16.3%), Commercial (5.8%)
Sectoral Share of Carbon Emissions (1998E): Industrial (55.5%), Transportation (20.2%), Residential (19.4%), Commercial (5.0%)
Fuel Share of Energy Consumption (1999E): Oil (42.7%), Coal (28.2%), Natural Gas (16.1%)
Fuel Share of Carbon Emissions (1999E): Oil (43.4%), Coal (42.9%), Natural Gas (13.7%)
Renewable Energy Consumption (1998E): 746 trillion Btu* (4% increase from 1997)

Number of People per Motor Vehicle (1998): 12.3 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Turkey is not a signatory to the United Nations Framework Convention on Climate Change or to the Kyoto Protocol.
Major Environmental Issues: Water pollution from dumping of chemicals and detergents; air pollution, particularly in urban areas; deforestation; concern for oil spills from increasing Bosporus ship traffic.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Antarctic Treaty, Biodiversity, Desertification, Hazardous Wastes, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Wetlands and Whaling. Has signed, but not ratified, Antarctic-Environmental Protocol and Environmental Modification. Has not signed the UN Framework Convention on Climate Change.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999

OIL AND GAS INDUSTRIES

State Oil Company: Turkish State Petroleum Company (TPAO)
State Refining Company: Turkish Petroleum Refineries Corporation (Tupras)
State Pipelines and Gas Agency: Botas
State Oil Products Retailer: Petrol Ofisi AS (POAS)
Major Ports: Iskenderun, Istanbul, Mersin, Izmir
Major Oil and Gas Fields: Bati Raman, Karakus, K. Karakus
Major Pipelines: Turkey-Iraq ; Turkey contains 1,078 miles of crude oil pipelines, 1,439 miles of oil product pipelines, and 439 miles of natural gas pipelines
Major Refineries (crude oil capacity): Izmit (226,440 bbl/d), Aliaga-Izmir (226,440 bbl/d), Kirikkale (113,200 bbl/d), Mersin (100,000 bbl/d), Batman-Siirt (22,015 bbl/d)

Sources for this report include: Agence France Presse; Alexander's Gas and Oil Connections; Asian Wall Street Journal; Associated Press Newswires; BBC Summary of World Broadcasts; Cambridge Energy Research Associates; CIA World Factbook 2000; CSIS Caspian Energy Update; Deutsche Bank special report, "Turkey: Winning the Gas Import Race;" Dow Jones Newswires; Economist Intelligence Unit Country Reports, ViewsWire; Energy Day; Energy Report; Financial Times; Global Power Report; Hart's European Petroleum Finance Week; Hart's Oil and Gas Investor; International Energy Agency; International Water Power and Dam Construction; Middle East Economic Digest; National Post (Canada); New York Times; Oil Daily; Oil and Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; Reuters; PR

Newswire; Turkish Daily News; Turkish Probe; U.S. Energy Information Administration; Wall Street Journal; Washington Post; World Gas Intelligence; World Markets Online.

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Links to other U.S. government sites:
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U.S. Department of Energy's Office of Fossil Energy's International section - Turkey
U.S. State Department's Consular Information Sheet - Turkey (July 2001)
US State Department's Country Commercial Guide - Turkey FY 2001
Library of Congress Country Study on Turkey (September 1987)
Information from the U.S. International Trade Administration

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Energy Information Administration

July 2002

Turkey: Environmental Issues

Introduction

Turkey's high rate of economic growth experienced during much of the 1990s, besides resulting in booming industrial production, also led to higher levels of energy consumption, imports, air and water pollution, and greater risks to the country's environment. In addition, increased oil exports from the Caspian Sea region to Russian and Georgian ports and across the Black Sea has led to increased oil tanker traffic (and risks of an accident) through the narrow, winding Turkish Straits (including the Dardanelles, Marmara Sea, and Bosporus Straits).

With Turkey now a formal candidate for membership in the European Union, Turkey's environmental record will come under heavy scrutiny. In 1983, Turkey promulgated the country's overarching "Environmental Law," and a national Ministry of Environment was created in 1991. Turkey is building an extensive network of hydroelectric energy sources in the southeast part of the country, and cleaner-burning natural gas is moving to replace coal in power generation.

Marine Pollution

Increased shipping traffic through the narrow Bosporus Straits has heightened fears of a major accident that could have serious environmental consequences and endanger the health of the 12 million residents of Istanbul that live on either side of the Straits. The Straits--a 19-mile channel with 12 abrupt, angular windings--have witnessed an increase in shipping traffic since the end of the Cold War to the point that around 50,000 vessels per year (nearly one every 10 minutes) now pass through them. Around one-tenth of these are oil or liquefied natural gas tankers. This increased congestion has led to a growing number of accidents; between 1988 and 1992, there were 155 collisions in the Straits. In January 2001, work began on building a comprehensive radar and vessel control system for the waterway.


The Bosporus Straits

With the high volume of oil being shipped through the Bosporus, oil tanker accidents can release large quantities of oil into the marine environment. This danger was underscored in March 1994, when the Greek Cypriot tanker *Nassia* collided with another ship, killing 30 seamen and spilling 20,000 tons of oil into the Straits. The resulting oil slick turned the waters of the Bosporus into a raging inferno for five days, but because the accident occurred in the Straits a few miles north of the city, a potential urban disaster was averted.

In the aftermath of the 1994 *Nassia* disaster, Turkey passed regulations requiring ships carrying hazardous materials to report to the Turkish environmental protection ministry. However, Turkey's power to regulate commercial shipping through the Straits is limited by the 1936 Treaty of Montreux that delineates the Straits as an international waterway. Although subsequent international agreements have given Turkey the right to regulate the right of passage through the Straits to ensure a steady and safe flow of traffic, due to pressure from some Black Sea border countries, Turkey has not been stringently enforcing the shipping laws passed in 1994. Thus, only a small number of vessels passing through the Straits report their cargo. In July 2001, Turkey's environment minister (Fevzi Aytekin) stated that he would use all legal tools at his disposal to stop Russian nuclear waste from being shipped through the Bosporus.

As the number of ships through the Straits grows, the risk of accidents increases, and traffic will likely increase as the six countries surrounding the Black Sea develop economically. With tonnage on the rise as well, the threat of collision is not the only danger: on December 29, 1999, the Volgoneft-248, a 25-year old Russian tanker, ran aground and split in two in close proximity to the southwest shores of Istanbul. More than 800 tons of the 4,300 tons of fuel oil on board spilled into the Marmara Sea, covering the coast of Marmara with fuel-oil and affecting about 5 square miles of the sea.

In addition, while major spills can bring about immediate environmental consequences, the presence of large oil- and gas-carrying ships in the Straits causes other problems, such as the day to day release of contaminated water as the ships ballast their holds. Pollution in the Straits contributed to a decline in fishing levels to 1/60th their former levels.

In the Black Sea, meanwhile, overfishing and pollution from surrounding countries have seriously damaged the ecosystem. Cleanup costs are estimated as high as $15 billion--far beyond the reach of the six countries bordering the sea. Although the 1996 Black Sea Strategic Action Plan envisions the establishment of a Black Sea Environmental Fund, financed by fees and levies on activities which use the Black Sea environment, more international financial support likely will be needed. In June 2002, environment ministers from Turkey and other Black Sea littoral states met in Sofia, Bulgaria to discuss plans to restore and protect the Black Sea from environmental damage.

To reduce the strain on the marine environment caused by ship traffic, Turkey has backed alternative means to transport oil and gas from Central Asia. Turkey has championed the Caspian oil pipeline route from Baku to the Turkish Mediterranean port of Ceyhan, as well as the Trans-Caspian gas pipeline from Turkmenistan across Azerbaijan and Georgia to Turkey. Although Turkey supported the creation of a pipeline route ending at the Georgian Black Sea port of Supsa for the "early oil" from the Caspian Sea, Turkey continues to support the Ceyhan terminal in the long-run to reduce the amount of oil shipped to Black Sea ports (which then must pass through the Bosporus to world markets). However, a recent Kazakh-Russian deal to ship more oil to the Russian Black Sea port of Novorossiisk guarantees that more oil will continue to flow through the Straits.

Air Pollution

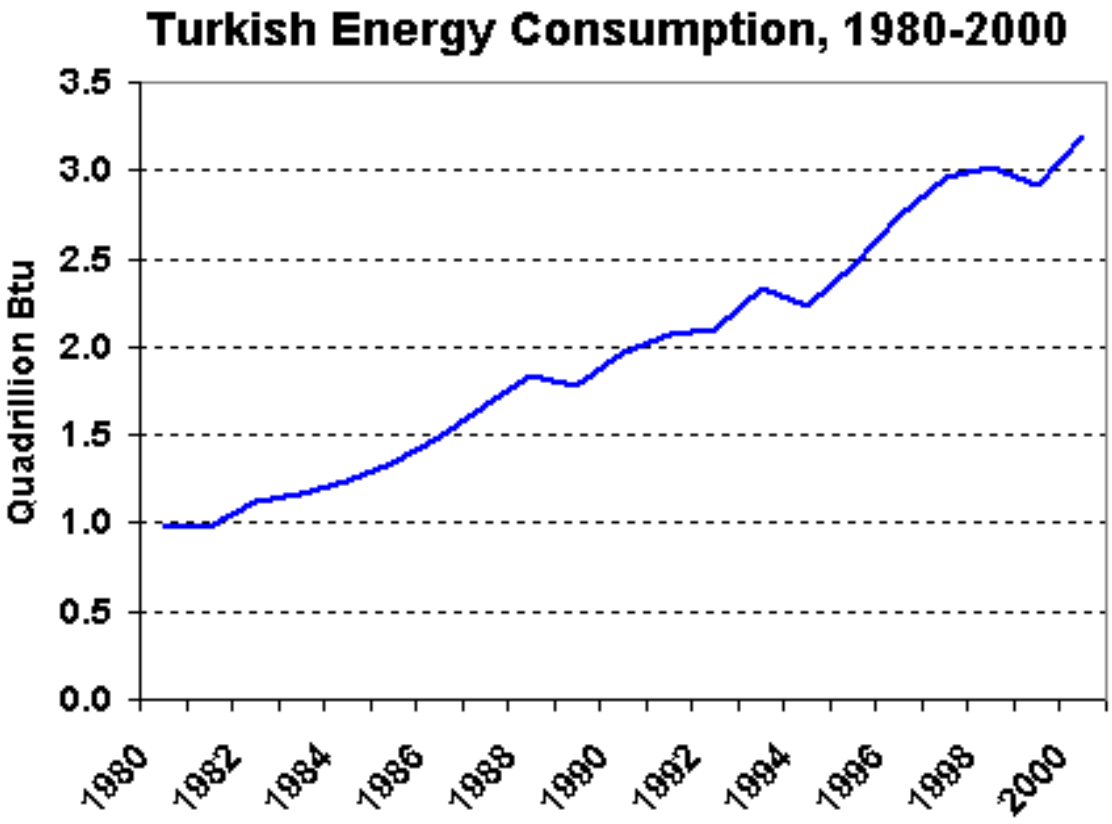
Air pollution is a major problem in Turkey, with key pollutants including sulfur dioxide, suspended particulates, nitrogen oxides, and carbon dioxide. Smog is a particularly bad problem in many Turkish cities, especially Istanbul. Rising energy consumption and the increase in car ownership have increased air pollution, and as Turkey continues to develop its economy, the problem likely will be exacerbated unless preventive actions are undertaken.

Recognizing these issues, the Turkish federal government and municipalities have taken several measures to reduce pollution from energy sources. In order to meet EU environmental standards, Turkey is requiring flue gas desulfurization (FGD) units on all newly commissioned coal power plants and is retrofitting FGD onto older units. In addition, the planned "Blue Stream" natural gas pipeline from Russia should provide the necessary supplies for Turkey to rely more heavily on cleaner-burning gas rather than coal.

The International Energy Agency (IEA) has criticized Turkey's efforts to reduce air pollution, saying that current measures do not go far enough. In its annual report on member countries, the IEA stated that Turkey needs to maintain and possibly increase investments in public transport, especially in urban areas, as well as improve the implementation of existing regulations on air quality. Additionally, the IEA has recommended that Turkey "consider the promulgation of appropriate energy conservation laws," "[strive] to limit the growth of greenhouse gas emissions," "tighten efficiency standards on industrial boilers and electric motors," "consider establishing fiscal and economic incentives for conservation...in all sectors," and further promote fuel switching from high-sulfur lignite to natural gas.

In May 2001, Greenpeace activists climbed the chimney of a waste incinerator in the northwestern city of Izmit to protest pollution from the plant. In 1998, the plant was closed by the Turkish Energy Ministry due to potential health hazards. The plant was reopened, however, in 1999.

Energy Consumption

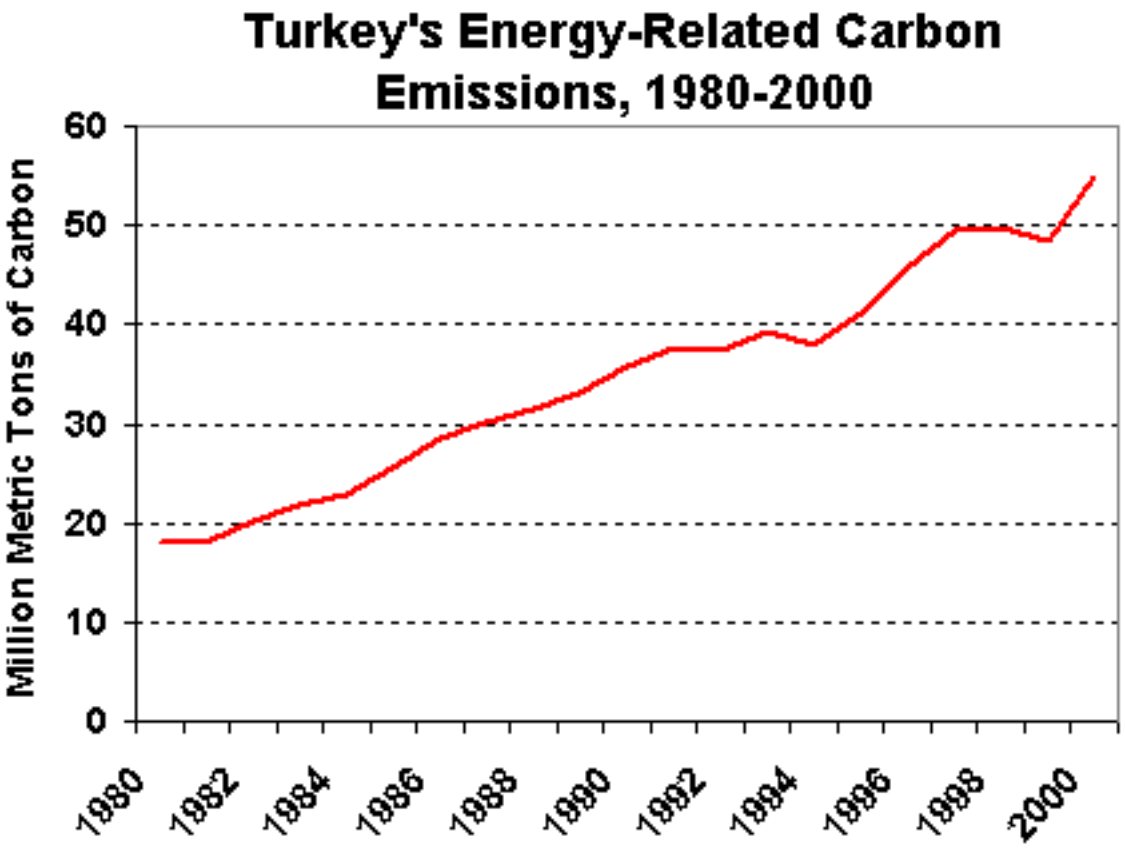


Turkish energy consumption has risen dramatically over the past 20 years. From just 1.0 quadrillion Btu (quads) in 1980, Turkey's domestic energy consumption has more than tripled, reaching a level of 3.2 quads in 2000. Although this is still low relative to similar-sized countries such as Germany (14.0 quads), France (10.4 quads), and Poland (3.7 quads), Turkey's upward trend may mean it will meet or even surpass these countries at some point in the future.

Of Turkey's total energy consumption, around half is used by the industrial sector, a quarter in residential, and the rest in transportation and commercial. Oil accounted for 42% of total Turkish energy consumption in 2000, with coal at 31% and natural gas at 17% but rising rapidly.

Although analysts have said that Turkey's continually increasing energy consumption is needed to power the country's developing economy, environmental critics believe that Turkey's economic policies have encouraged energy waste. Because the Turkish energy sector is mainly state-owned, critics charge that the government's pricing policy has encouraged the inefficient use of energy. Experts claim that about as much as 30% of electricity generated in Turkey is lost because of inefficient distribution and generation systems. In turn, they argue, this energy waste has necessitated the accelerated growth in energy demand and imports.

Carbon Emissions



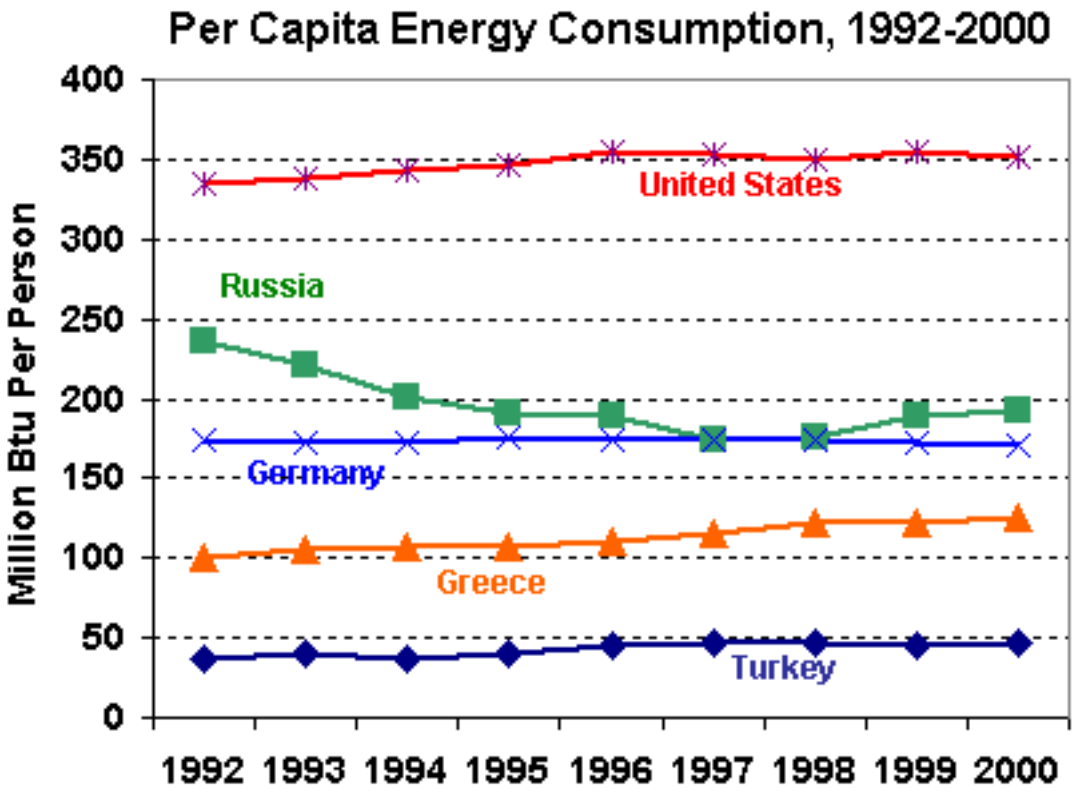
Turkey's carbon emissions have risen in line with the country's energy consumption. Since 1980, Turkey's energy-related carbon emissions have jumped from 18 million metric tons annually to 55 million metric tons in 2000. Once again, while this is low in absolute terms compared to other IEA countries, the rate of increase is rapid.

Turkey is not a party to the U.N. Framework Convention on Climate Change (UNFCCC) or the Kyoto Protocol, meaning the country has no binding requirements to cut carbon emissions by the 2008-2012 period as most other IEA countries have. However, Turkey has established a National Climate Coordination Group (NCCG) to carry out the national studies in line with those conducted by all countries of the UNFCC. The Climate Coordination Group has published several influential findings, including the "National Report on the Protection of the Atmosphere and Climate Change" and a "National Report on Energy and Technology."

Armed with the research of the NCCG and with studies underway for a National Climate Programme, Turkey is considering accession to the Kyoto Protocol. Additional pressure to meet EU standards make it increasingly likely that Turkey will accept some level of binding emission reduction requirements in the foreseeable future.

Energy and Carbon Intensity

In 2000, Turkey's level of energy intensity--energy consumption per GDP dollar--stood at 15,533 Btu/$1995, a rate 42% higher that of the United States (10,918 Btu/$1995). Turkish carbon intensity in 2000 was 0.27 metric tons of carbon/thousand $1995, 59% higher than the U.S. intensity of 0.17 metric tons of carbon/thousand $1995. Turkey's high energy and carbon intensities are due in large part to the predominance of energy intensive industries such as iron and steel, cement, and petrochemicals, in the country.



Despite upward trends in recent years, Turkey still has the lowest energy-related CO_2 emissions per capita and energy consumption per capita among IEA countries. In 2000, Turkey's carbon emissions per capita were 0.8 metric tons (compared to the US value of 5.6 metric tons). Turkey's per capita energy consumption was 47.5 million Btu in 2000, compared to 351 million Btu in the United States., 192.9 million Btu in Russia, 170.4 million Btu in Germany, and 126.1 million Btu in Greece. Since 1992 energy consumption per capita in Turkey has increased by 29%, compared to a 25% increase in neighbor Greece, a 5% increase in the United States, a decline of 18% in Russia, and a slight decrease of 2% in Germany.

With emissions and consumption on the rise, the IEA has urged Turkey to adopt more energy-efficient policies. In addition to implementing policies expanding the use of natural gas for electricity generation and in residential heating, the IEA believes that Turkey should increase insulation to raise performance of heating systems in buildings.

Market reform--especially price reform--should lead to more efficient energy use as the disincentive to energy conservation is removed. As businesses and households are forced to pay more for their energy usage, consumers will look for ways to reduce their energy use. Increased dissemination of information on energy savings measures will benefit consumers in Turkey, and undertaking energy audits will help industry become more energy efficient and reduce energy waste.

Renewable Energy

Non-fossil energy sources have a high share of energy supply in Turkey. Hydroelectric power already accounts for about 40% of electricity demand, and there is much additional potential for growth. As of November 2000, there were 120 hydroelectric power plants in operation, with 34 more under construction. Ultimately, 329 more hydroelectric plants are projected to make use of remaining hydro potential generation of 69,326 gigawatt-hours (GWh) per year. Around 122,000 GWh per year of hydroelectric power is considered economically exploitable in Turkey.

Turkey's rapid growth in hydroelectric production in the water-starved Middle East has provoked disputes with neighboring countries. Both Syria and Iraq have been at odds with Turkey's proposed construction of dams on the Euphrates (Syria) and Tigris Rivers (Iraq) that threaten to choke off water supply to their countries. The $1.6-billion Ilusu hydroelectric dam project on the Tigris River, part of the wide-ranging Southeast Anatolia Project for economic development in the region, has had the financial backing of a consortium made up of the United Kingdom, the United States, Switzerland, and Germany. In late 2001 and early 2002, however, two British firms -- Balfour Beatty and Amec -- decided not to invest in the project following threats from environmentalists and others opposed to the dam. In general, the Greater (Southeastern) Anatolia Project (GAP) is one of the largest hydropower projects in the world, involving 22 dams and 19 hydroelectric power facilities on the Tigris and Euphrates rivers.

The consortium backed the dam scheme to allow Turkey to generate electricity with hydro power rather than to rely on nuclear, but the project has come under fire from protesters who allege that it will mean the destruction of 52 villages and 15 towns in the heart of Kurdish-populated areas and displace 20,000 people. The plan also is controversial on environmental grounds because it would destroy a designated archaeological site, provide poor reservoir quality through raw sewage discharges into the dam, and potentially have significant downstream consequences for the water supply in both Iraq and Syria.

In addition to hydroelectric power, Turkey is encouraging the construction of wind power plants. The first facility was commissioned in December 1998, and the country has a goal of deriving 2% of its electricity from wind power. Overall, Turkey is considered to have significant wind power potential -- up to 20,000 MW -- at several sites, including the Marmara Sea region, the Mediterranean and Aegean Sea coasts, and inland Anatolia. Wind capacity is expected to grow rapidly in coming years (possibly to 4,000 MW by 2010), assuming that private investment is available. In January 2001, Turkey announced approval for 29 build-operate-transfer (BOT) power stations, including 17 wind-powered plants.

Turkey has extended its involvement in geothermal energy projects, supported by loans from the Ministry of Environment, and geothermal energy is expected to increase substantially in coming years. Overall, Turkey has an estimated 4,500 MW of geothermal power production potential. Current Turkish geothermal generating capacity is 820 MW.

Solar energy also could provide significant amount of power for Turkey, given the country's suitability in terms of solar radiation. Currently, solar power is used mainly for domestic hot water production.

The country's first nuclear power plant is planned for Akkuyu on Turkey's Mediterranean coast but has raised the ire of environmentalists, who say that what is needed is not more power generation but more efficient relay and distribution systems. Also, environmentalists point to the fact that the proposed site is less than 15 miles from an active geological fault line, which stirs safety fears in light of the earthquakes of 1999. In early March 2000, the Turkish government once again delayed an announcement of the winning bid for Akkuyu, for which the tender process began in 1996.

While renewable energy sources have made great inroads in Turkey's energy supply mix, there is a need

for more research and development on renewable energies to increase their efficient utilization. Although hydroelectric resources are being developed, the extensive use of wood in households has contributed greatly to urban air pollution, as well as created problems with deforestation. Additionally, Turkey needs to create a level playing field for renewables by allowing prices of conventional fuels to rise to market levels. This would help diversify and increase the use of alternative energies as sources for transport, such as natural gas-operated municipal buses and electricity-operated railway systems.

Environmental Outlook

As Turkey resumes economic growth in coming years and attempts to meet EU membership criteria, it will increasingly need to take environmental considerations into account. Improved energy efficiency is a key to this strategy, with reduction of state energy subsidies allowing energy prices to more accurately reflect true costs. Overall, Turkey's energy demand is expected to increase by 2.9% annually through 2020, while carbon emissions grow by a somewhat slower 2.2% yearly rate, as natural gas and renewables (which emit no carbon) consumption grows faster than coal usage.

To the extent that natural gas and renewables replace more carbon-intensive fuels, the country's increased use of natural gas will further diversify the Turkish energy supply and contribute to the mitigation of urban pollution and CO_2 emissions. By setting differentiated taxes to promote the use of cleaner fuels (and, in particular, to promote the use of low-sulfur heavy fuel oil), Turkey can significantly stem the rising tide of carbon emissions and other pollutants.

Energy Information Administration

BAB EL-MANDAB (RED SEA) BOSPORUS PANAMA CANAL/PIPELINE
RUSSIA STRAIT OF HORMUZ STRAIT OF MALACCA SUEZ CANAL/SUMED PIPELINE

November 2001

World Oil Transit Chokepoints

The following presents information on major world oil transit centers. Over 30 million barrels per day (bbl/d) pass through the relatively narrow shipping lanes and pipelines discussed below. These routes are known as chokepoints due to their potential for closure. Disruption of oil flows through any of these export routes could have a significant impact on world oil prices.

The information in this report is the best available as of November 2001 and is subject to change.

Bab el-Mandab

Location: Djibouti/Eritrea/Yemen; connects the Red Sea with the Gulf of Aden and the Arabian Sea
Oil Flows (2000E): 3.2-3.3 million bbl/d
Destination of Oil Exports: Europe, United States, Asia
Main Concerns: Closure of the Bab el-Mandab could keep tankers from the Persian Gulf from reaching the Suez Canal/Sumed Pipeline complex, diverting them around the southern tip of Africa (the Cape of Good Hope). This would add greatly to transit time and cost, and effectively tie up spare tanker capacity. In December 1995, Yemen fought a brief battle with Eritrea over Greater Hanish Island, located just north of the Bab el-Mandab. The Bab el-Mandab could be bypassed (for northbound oil traffic by utilizing the East-West oil pipeline, which traverses Saudi Arabia and has a capacity of about 4.8 million bbl/d. However, southbound oil traffic would still be blocked. In addition, closure of the Bab el-Mandab would effectively block non-oil shipping from using the Suez Canal, except for limited trade within the Red Sea region.

Bosporus/Turkish Straits

Location: Turkey; this 17-mile long waterway divides Asia from Europe and connects the Black Sea with the Mediterranean Sea
Oil Flows (2000E): 1.6 million bbl/d
Destination of Oil Exports: Western and Southern Europe;
Main Concerns: Only half a mile wide at its narrowest point, the Turkish Straits are one of the world's busiest (50,000 vessels annually, including 5,500 oil tankers), and most difficult-to-navigate waterways. Many of the proposed export routes for forthcoming production from the Caspian Sea region pass westwards through the Black Sea and the Turkish Straits en route to the Mediterrean Sea and world markets. The ports of the Black Sea, along with those in the Baltic Sea, were the primary oil export routes of the former Soviet Union, and the Black Sea remains the largest outlet for Russian oil exports. Exports through the Turkish Straits have grown since the breakup of the Soviet Union in 1991, and there is growing concern that projected Caspian Sea export volumes exceed the ability of the Turkish Straits to accommodate the tanker traffic. Turkey is concerned that that the projected increase in large oil tankers would pose a serious navigational safety and environmental threats to the Turkish Straits. In July 2000, the International Energy Agency estimated that exports through through the Black Sea could reach 2.3 million bbl/d, but that the Turkish Straits could handle only 1.8 million bbl/d maximum.

Panama Canal and Trans-Panama Pipeline

Location: Panama; connects the Pacific Ocean with the Caribbean Sea and Atlantic Ocean
Oil Flows (2000E): 0.5 million bbl/d
Main Concerns: The Panama Canal extends approximately 50 miles from Panama City on the Pacific Ocean to Colon on the Caribbean Sea. In fiscal year (FY) 2000, petroleum and petroleum products was the second largest commodity (by tonnage) shipped through the Canal after grain, and accounted for 14% of total canal shipments. Over 70% of total oil shipments went south from the Atlantic to the Pacific, with oil products dominating southbound traffic. Coal and petrochemicals are shipped through the canal as well, accounting for 5% and 1%, respectively, of total Canal traffic. The largest vessel that can transit the Panama Canal is known as a PANAMAX-size vessel. A long-term program is underway to widen the narrow, eight-mile stretch of Gaillard Cut to allow unrestricted two-way traffic of PANAMAX-size vessels.

If transit were halted through the Canal, the 860,000 bbl/d Trans-Panama pipeline (Petroterminal de Panama, S.A.) could be re-opened to carry oil in either direction. This pipeline is located outside the Canal Zone near the Costa Rican border, and runs from the port of Charco Azul on the Pacific Coast (near Puerto Armuelles) to the port of Chiriqui Grande, Bocas del Toro on the Caribbean. Interest has been shown by Caribbean producers in plans to reverse the pipeline to go southbound from the Atlantic to the Pacific. This reversal would allow increased oil production from Caribbean producers to find outlets on the West Coast and other Pacific markets.

Russian Oil and Gas Export Pipelines/Ports

Location: Russian oil and gas exports transit via pipelines that pass through Russia, Ukraine, Belarus, Hungary, Slovakia, the Czech Republic, and Poland,
Major Oil Export Ports: Novorossiisk (Russia); Ventspils (Latvia); Odessa (Ukraine), Tuapse (Russia)
Major Oil Pipeline (capacity, 2001E): Druzhba (1.2 million bbl/d)
Major Natural Gas Pipelines (capacity, 2001E): Brotherhood, Progress, and Union (1 trillion cubic feet, tcf, each); Northern Lights (0.8 tcf); Volga/Urals-Vyborg, Finland (0.1 tcf). Yamal (to Europe, via Belarus; 1.0 Tcf, partly operational); Blue Stream (to Turkey via Black Sea; 0.56 Tcf, under construction)
Destination of Oil and Gas Exports: Eastern Europe, Netherlands, Italy, Germany, France, other Western Europe.
Main Concerns: Russia is a major supplier of crude oil and natural gas to Europe. All of the ports and pipelines (with the exception of the Druzhba oil pipeline) are operating at near capacity, leaving limited alternatives if problems arose at Russian export terminals.

Strait of Hormuz

Location: Oman/Iran; connects the Persian Gulf with the Gulf of Oman and the Arabian Sea
Oil Flows (2000E): 15.5 million bbl/d
Destination of Oil Exports: Japan, United States, Western Europe
Issues and concerns: By far the world's most important oil chokepoint, the Strait consists of 2-mile wide channels for inbound and outbound tanker traffic, as well as a 2-mile wide buffer zone. Closure of the Strait of Hormuz would require use of longer alternate routes (if available) at increased transportation costs. Such routes include the 5 million-bbl/d capacity Petroline (East-West Pipeline) and the Abqaiq-Yanbu natural gas liquids line across Saudi Arabia to the Red Sea.

Strait of Malacca

Location: Malaysia/Singapore; connects the Indian Ocean with the South China Sea and the Pacific Ocean.
Oil Flows (1999E): 10.3 million bbl/d
Destination of Oil Exports: Japan, South Korea, China, other Pacific Rim countries.
Main Concerns: The Strait of Malacca, linking the Indian and Pacific Oceans, is the shortest sea route between three of the world's most populous countries -- India, China, and Indonesia -- and therefore is considered to be the key choke point in Asia. The narrowest point of this shipping lane is the Phillips Channel in the Singapore Strait, which is only 1.5 miles wide at its narrowest point. This creates a natural

bottleneck, with the potential for a collision, grounding, or oil spill (in addition, piracy is a regular occurrence in the Singapore Strait). If the strait were closed, nearly half of the world's fleet would be required to sail further, generating a substantial increase in the requirement for vessel capacity. All excess capacity of the world fleet might be absorbed, with the effect strongest for crude oil shipments and dry bulk such as coal. Closure of the Strait of Malacca would immediately raise freight rates worldwide. More than 50,000 vessels per year transit the Strait of Malacca. With Chinese oil imports from the Middle East increasing, the Strait of Malacca is likely to grow in strategic importance in coming years.

Source: Oil Capital Ltd.

Suez Canal and Sumed Pipeline

Location: Egypt; connects the Red Sea and Gulf of Suez with the Mediterranean Sea

Oil Flows (2000E): 3.0-3.1 million bbl/d. Of this total, the Sumed Pipeline transported 2.2 million bbl/d of oil northbound (nearly all from Saudi Arabia). The Suez Canal transported around 820,000 bbl/d of petroleum in 2000. Southbound trade consisted of about 180,000 bbl/d of petroleum, around 90% of which was refined products and the rest crude oil. Northbound trade consisted of about 640,000 bbl/d of petroleum, nearly 60% of which was crude oil. For the first eight months of 2001, an average of about 238 oil tankers passed through the Suez Canal each month, 20% of the total, and significantly below the canal's capacity. Currently, the Suez Canal can accommodate ships with drafts of up to 58 feet, which means that very large crude carriers (VLCCs) and ultra large crude carriers (ULCCs) cannot pass through the Canal. The Egyptian government plans to widen and deepen the Suez Canal, so that by 2010 it can accommodate VLCCs and ULCCs. Capacity on the Sumed pipeline has been expanded to 3.1 million bbl/d, linking the Ain Sukhna terminal on the Gulf of Suez with Sidi Kerir on the Mediterranean.

Destination of Sumed Oil Exports: Predominantly Europe; also United States.

Main Concerns: Closure of the Suez Canal and/or Sumed Pipeline would divert tankers around the southern tip of Africa (the Cape of Good Hope), adding greatly to transit time and effectively tying up tanker capacity.

For more information on any of the countries or topics listed in this report, see these other sources on the EIA web site:

EIA - International Energy Data

Energy Supply Security - The latest information on events that could affect energy security

Panama Canal
Russian Oil and Gas Exports Fact Sheet
World Crude Oil Flows 1997 - Map

Links to other U.S. government sites:
Panama Canal Commission
National Defense University, Institute for National Strategic Studies - The South China Sea
National Defense University, Institute for National Strategic Studies - Southeast Asian Chokepoints

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Egypt State Information Service, The Yearbook 1998 - Suez Canal
Egypt State Information Service, Calendar - The Inauguration of the Suez Canal
Panama Canal Authority (in Spanish)
Turkish Maritime Pilots' Association

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